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ABSTRACT

This is a report on the process and effects of educational change efforts. It is based on educational research and on informed opinions of mathematics, science, and social science educators. The introduction presents a model of how responsibilities for inventing, disseminating, and implementing innovations may be divided between schools or districts and outside agencies. Chapter 2 describes environmental, organizational, and individual influences on the change process. Chapter 3 discusses change strategies which have been tried and studied and reports on their effects. It summarizes arguments about the efficacy of curriculum development as a change strategy by itself, then describes various models or strategies which have been tried to improve or extend the effects of curriculum development. Chapter 4 discusses the variety of goals that change strategies can aim at and summarizes major weaknesses of research on change strategies. The final chapter presents recommendations for needed research. (Author/DT)

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FACTORS INFLUENCING SCHOOL CHANGE

FINAL REPORT

June, 1976

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ABSTRACT

This is a report on the process and effects of educational change efforts. It is based on educational research and on informed opinions of mathematics, science and social science educators. The Introduction presents a model of how responsibilities for inventing, disseminating, and implementing innovations may be divided between schools or districts and outside agencies. It provides an analytic framework that clarifies the distinctions among very broad approaches to change.

Subsequent chapters review in some detail what research and practice have established about the local change process and specific strategies. Chapter 2 describes environmental, organizational, and individual influences on the change process. The political, economic and legal environment of schools has profound implications for whether and how they innovate. Public opinion, teacher unions, and state and federal laws affect schools' needs and practices. Organizational conditions within schools and districts are also important. They involve decision-authority patterns, leadership and change agent roles, staff, communications and incentive systems, and various demographic variables. Important individual conditions include the characteristics and motivations of principals and teachers in schools implementing change.

Chapter 3 discusses change strategies which have been tried and studied and reports on their effects. It summarizes arguments about the efficacy of curriculum development as a change strategy by itself, then describes various models or strategies which have been tried to improve or extend the effects of curriculum development. These include strategies for information dissemination, training, and promoting linkages relevant to the adoption and implementation of innovations.

The generalizations offered in Chapters 2 and 3 are tentative in nature since research on educational change deals with a great variety of change goals and suffers from many methodological weaknesses. In Chapter 4, the variety of goals that change strategies can aim at is discussed. In addition, this chapter summarizes major weaknesses of research on change strategies. They include the problem that evaluation frequently depends on inappropriate goals and on inadequate sampling designs and measurement approaches. Additionally, the chapter notes a need for a more longitudinal perspective in change strategy evaluation.

The final chapter presents recommendations for needed research: 1) that researchers and practitioners share and use their present knowledge about change strategies; 2) that researchers conduct field trials, continue to seek models of change, gather more trustworthy information on outcomes, and remain clear about differences among change goals; and 3) that new strategies for adaptive user-modification of innovations be explored.

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PREFACE

Recent years have seen an unparalleled federal investment in educational change. A variety of strategies have been funded and tried for improving education. Reformers have worked to achieve change through mandate, through persuasion, through providing materials and/or assistance, and through training for change participants.

The National Science Foundation, charged with improving instruction in mathematics, science, and the social sciences, has played a special role in this movement. These are areas where the applicability of education to the security and welfare of society is widely recognized, and when there is disappointment with the results of educational change efforts, it is perhaps felt even more keenly if efforts were directed at improvements in these areas.

Fairly or unfairly, such disappointment is intense and widespread. This report is about the process and effects of educational change efforts. It presents a series of generalizations which we feel are warranted by research. Studies offered in support of particular points are those which are most recent and most informative, but generally they are not the only evidence available. Our extensive source list gives some indication of the growing literature on which we base this report. However, we add the caution that research relevant to educational change is more often than not limited by sampling and other methodological weaknesses. Thus, this report is offered as our current version of the state-of-the-art, a version we expect will change as research progresses and methodologies improve.

Chapter 1, the Introduction, explains the boundaries and parameters which describe what we include as educational change strategies. Chapter 2 discusses conditions which are likely to determine how such strategies will work in the real world. Chapter 3 reports on how such strategies have worked in the instances where they have been used. Chapters 2 and 3 have a tentative nature, due to the inadequacies of much of the research on which they are based. Accordingly, Chapter 4 addresses the question of change strategy evaluation and specifies goal-issues and methodological weaknesses which need to be resolved. Chapter 5 describes needed research --where do we go from here?

The literature reported here uses many terms to refer to educational change and educational change efforts. Most of these efforts aim at facilitating the adoption and implementation of innovative curricula developed through systematic research and development. Thus, discussions will generally revolve around curriculum innovation or innovation-adoption/implementation. However, it should be kept in mind that educational change does not always involve a specific product or set of materials, as might be implied by the term "innovation." Educational innovation refers generally to changed organizational or instructional processes, usually but not always involving the use of new educational materials.

Much of the information presented here was gathered through conversations with developers and users of precollege math, science, and social science curricula. Individuals who contributed to our research and thinking are listed in the back of the report. While we are greatly indebted to these sources, the interpretations are our own, unless otherwise stated.

Additionally, we are indebted to Paul Hood, Kathleen Devaney, Fred Rosenau, Gerald Zaltman, Michele Finigan, and Alan Parker for insightful and constructive reviews of earlier versions.

CHAPTER 1

INTRODUCTION: ASSISTING EDUCATIONAL CHANGE

The idea that federal or other outside agencies can properly take <u>any</u> role with respect to local schools' implementation of curriculum innovations is now controversial. Recent research evidence (Berman & McLaughlin 1975) seems to buttress a growing conviction that only local initiative will lead to effective change. The last few years have seen arguments against "top-down" change that is centrally invented and disseminated to school districts (Sarason 1971, Fullan 1972, Simon & Levin 1974) and against the assumption that different districts can or should implement an innovation in the same way (House 1975).

These arguments suggest that outside agencies should neither interfere with local adoption decisions nor require that innovations be implemented according to precise blueprints. It does not necessarily follow that the government should abandon any role in local change efforts. After all, recent evidence also suggests that school people trying to implement innovations need support in the form of money, time, or linkages with colleagues (Fullan & Pomfret 1975, Berman & McLaughlin 1975, Schmuck et al. 1975).

Rather than embracing an extreme position by either attempting to control local innovation or letting it proceed in isolation, an outside agency can pursue a number of other options. To clarify these options, we have developed a diagram, figure 1, that shows various stages of the innovation process where responsibilities may be divided between the federal and local levels.

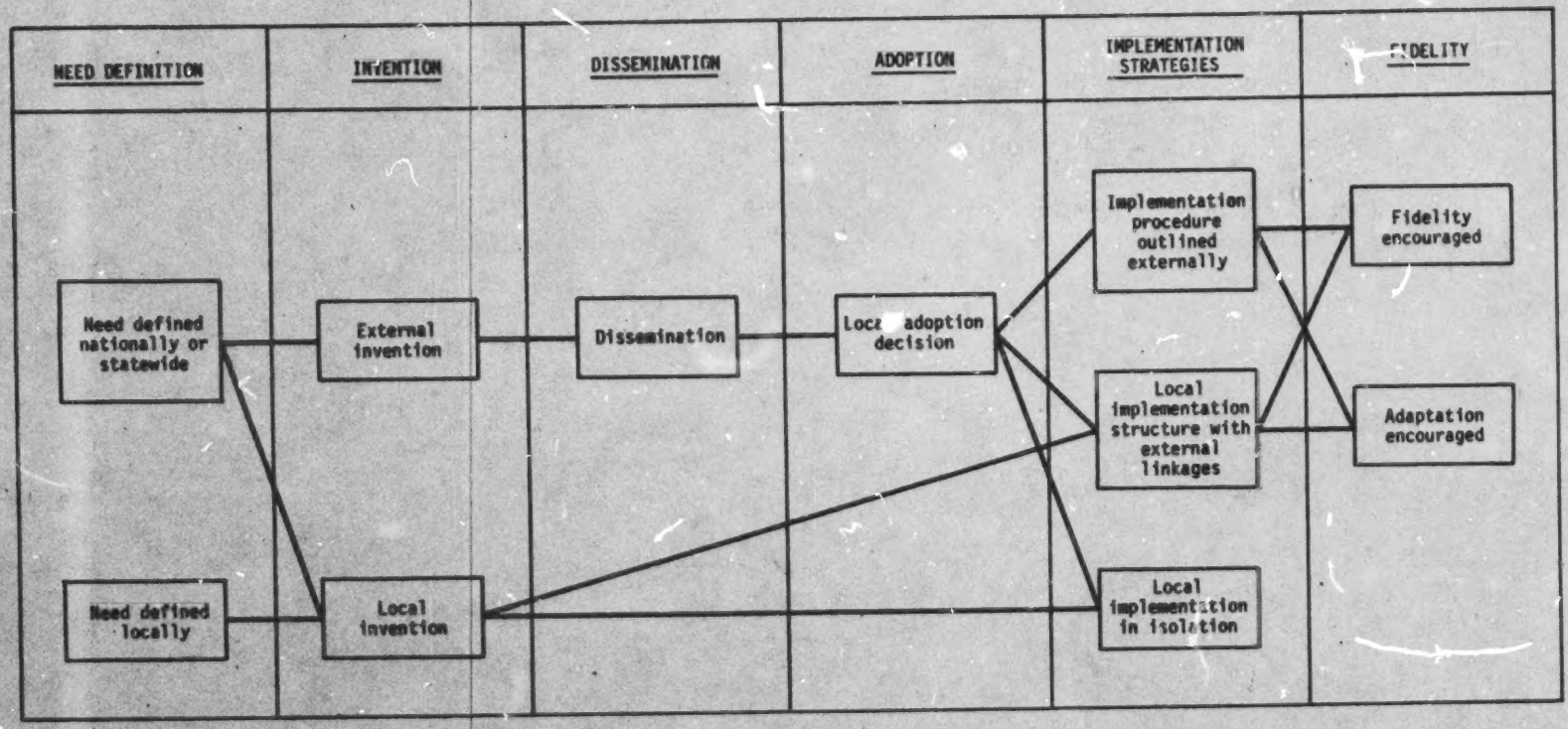

Figure 1 - Alternative Paths Toward Innovation

This diagram illuminates some of the important lessons of the past fifteen or twenty years of government experience with educational innovation and suggests various policy options which preserve local choice but do not isolate local educators from resources and colleagues. The diagram illustrates the fact that government agencies have options corresponding to many stages of educational innovation--need definition, invention, implementation mechanisms, and implementation outcomes--and careful intervention at any of these stages need not threaten local autonomy. Various paths through this diagram are well-worn by previous efforts to develop, disseminate, and implement innovations; for some, there is research evidence on their effectiveness. However, such evidence frequently fails to gauge the overall appropriateness of the path taken, i.e., to study whether efforts which are unsuccessful for one path would work well if a different path was taken. Before charting the various paths, we must explain each term in the diagram more fully.

Definition of Terms in Figure 1

Need Definition

What concerns us here is the locus of a decision, rather than the process by which people decide that innovations are needed.

Need defined nationally or statewide. A federal or state bureau is likely to emphasize certain curriculum areas, a certain age group, urban or rural schools, or some other part of the very broad field of education. Defining a need at a national level does not have to mean that local needs are ignored; one national- or state-level procedure would be to poll local educators on their needs and thus arrive at priorities for development.

Need defined locally. This takes place when a district either supports innovation with its own funds or receives outside money with

a very broad purpose (like that of Title III of the Elementary and Secondary Education Act, which simply supports "innovation").

Invention

External invention. The conceptualization and development of innovations are "external" when they take place outside school systems where the innovations are to be used. Curriculum development by teams of experts falls in this block of the diagram.

Local invention. Under some federally funded programs, local personnel design their own innovative projects. In the conceptual framework we are using, local invention is parallel to the local adoption of an externally invented innova[illegible].

Dissemination

When an innovation is developed externally, dissemination is the process by which local school people are made aware of it.

Local Adoption Decision

Every innovation model that we know of allows local choice at the adoption stage. Dissemination, however enthusiastically carried out, has never preempted local sovereignty.

Implementation Strategies

Educational change agents have learned only recently that adoption of an innovation (whether invented locally or externally) does not guarantee local implementation. Much literature has addressed the question of what local structures and procedures facilitate or impede implementation.

For the purposes of this discussion, though, we will only distinguish among the different approaches that external agencies (such as the National Science Foundation) can take at the implementation stage.

Implementation procedure outlined externally. If an innovation is invented outside the school districts where it will be used, its inventors may prescribe a set of steps that will guide users to effective implementation. These will be elements of the implementation process such as planning sessions, staff training, mechanisms for parent participation, and so on.

Local implementation structure with external linkages. This block includes a wide variety of approaches in which local educators take the lead in implementation but outside agencies make a deliberate effort to offer them resources. Such resources are technical assistance, staff development institutes, and networks of colleagues. The approaches may aid in the implementation of innovations that have been generated either inside or outside the district.

Local implementation in isolation. When outside agencies take a hands-off approach, local personnel may use a variety of implementation mechanisms, but they have only those outside resources that they locate for themselves.

Fidelity.

Fidelity encouraged. If an outside agency takes some role in support of implementation, it may choose to encourage adherence to a particular way of using an innovation.

Adaptation encouraged. Alternatively, outside suggestions or resources may be directed to helping local users alter a model to fit their own circumstances.

What Experience Does and Does Not Tell Us

When we distinguish among the different stages at which outside agencies may intervene in the innovation process, the policy suggestions drawn from recent experience can be more precise than simple calls for less interference or more support. The diagram allows us to show the paths that past federal programs have pursued. It indicates that, if one path gives disappointing results, a number of alternatives are available. It also prevents us from drawing overly broad generalizations from specific experiences.

For example, federally sponsored educational research and development of the 1960s often took the path displayed in figure 2.

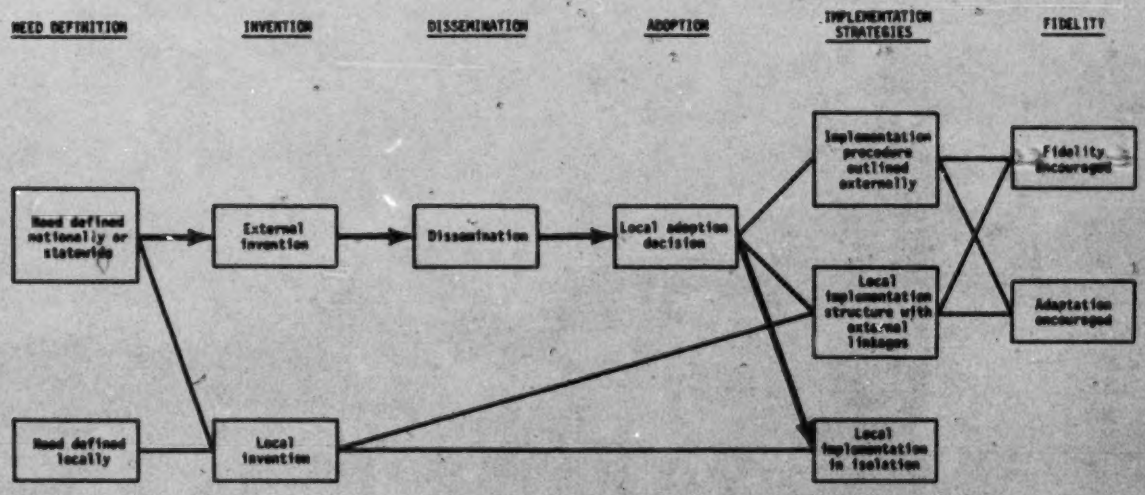

Figure 2 - The RDDA Approach

Based on a perception of national needs, subject-matter experts developed innovative curricula which were disseminated and, once adopted, usually implemented by local people without much outside guidance. This was the research-development-dissemination-adoption (RDDA) model (Clark & Guba 1965) that has since drawn criticism for failing to take the implementation phase into account. In general, developers assumed that school people would have no trouble implementing these innovative curricula--and, in general, evidence has disproved their assumption (Sarason 1971, House 1974, Turnbull et al. 1974, Fullan & Pomfret 1975). According to follow-up studies, even when an innovation appears simple to its developers, its unfamiliarity (and perhaps its unsuitability to some situations) is likely to cause problems for users.

Different researchers suggest different remedies for the weaknesses of the RDDA model, depending on which link in its chain strikes them as conceptually faulty. To House (1974), the slow pace of implementation around the country is a sign that external invention is inappropriate; because no two schools or classrooms are identical, he says we should abandon the pursuit of "transferable" innovations and drastically decentralize R&D. But others, blaming RDDA's disappointing results on the strategy of local implementation in isolation, suggest instead that local adoption be followed by more outside resources and help for implementation (Turnbull et al. 1974, Fullan & Pomfret 1975). Fullan and Pomfret go on to suggest that fidelity to a blueprint--the goal of most RDDA efforts--is misguided and that instead adaptation should be encouraged.

In the mid-1960s, at the same time as the federal government funded centralized development efforts, it also took a different approach to innovation--the "seed-money" approach, which took the path traced in figure 3.

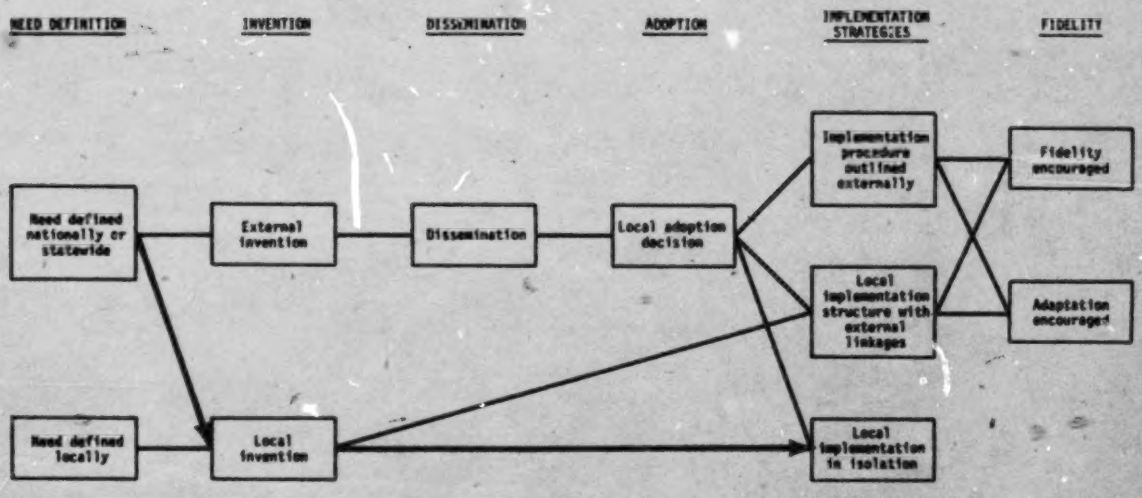

Figure 3 - The "Seed-Money" Approach

The seed-money programs are the principal subject of the recent Rand study of change-agent efforts (Berman & McLaughlin 1975); as the diagram shows, they are quite different from the RDDA programs depicted in figure 2. Some of them started with a central definition of need, focusing on bilingual or career education, for instance, while Title III of ESEA allowed each district to choose its own priority area. In general, though, they relied on local invention rather than centralized development, and implementation was strictly a local matter. (An exception to this pattern which Rand researchers studied was the Right to Read program; because it supplied districts with an externally-invented model that included specific implementation procedures, the Right to Read strategy proceeded along the top edge of the diagram, in contrast to the other change-agent programs.)

The Rand researchers found that, while a project might bring about change in a district, typically its goals would also change during implementation, becoming less ambitious in a process of "mutual adaptation." In addition to describing mutual adaptation, the Rand study draws a number of conclusions about effective strategies for project initiation and implementation. Important to these strategies, virtually all of which are locally based, are; project initiation in response to a specific local need, adaptive planning, staff training, and administrative support at all stages.

Understanding the unique characteristics of the seed-money approach, while it does not detract from the quality of the Rand study, does indicate that there may be important limits on the generalizability of that study's conclusions. For instance, when the authors say that materials should be developed locally rather than adopted from external sources, it is

important to remember that most of the projects they studied were local inventions. Their conclusion may apply to local personnel who are mounting an ambitious change effort and thus need the added enthusiasm that comes with a sense of ownership of materials; it may or may not apply to an individual teacher looking for a new social science unit.

By and large, federal change efforts of the 1960s devoted little attention to the implementation phase. In the RDDA model, it was assumed that implementation automatically followed adoption; the seed-money approach made the same assumption and left local educators even more isolated. More recently, though, developers have paid some attention to the importance and problematic nature of local implementation. A federal program that took this phase into account was Head Start Planned Variation (HSPV), which followed the path traced in figure 4.

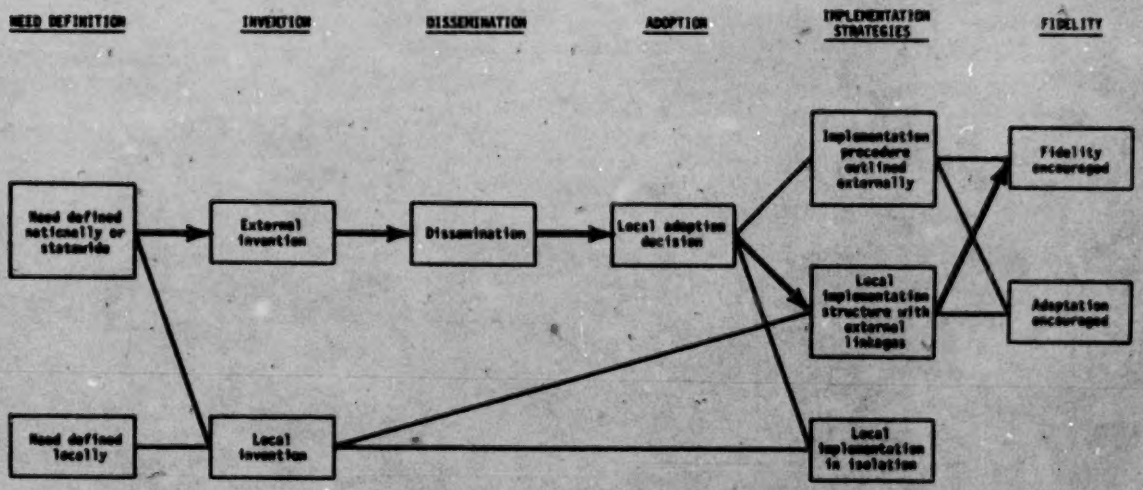

Figure 4 - A Model-Replication Approach (Head Start Planned Variation)

Believing in the RDDA model, federal planners originally thought that once sponsors had developed a set of models for early-childhood education and several local sites had each adopted a model, implementation would follow automatically and the effects of the models could soon be tested and compared. It became clear, however, that faithful implementation was not a foregone conclusion, and the sponsors provided the sites with more technical assistance than they had at first envisioned. The implementation strategies were ad hoc: sponsors did whatever seemed likely to move the sites toward replication of the models. But an important feature they shared was an emphasis on fidelity. Since Planned Variation was conceived as an experiment, a well-specified treatment had to be in place at each site, and therefore sponsors tried to bring about the teacher behaviors that would characterize full implementation of their models.

One lesson of HSPV was an old one: implementation is unlikely to match developers' expectations if local districts are left on their own after adopting an innovation. The experience of HSPV has taught us new lessons, though, about programs that encourage fidelity to a model. Trying to meet the requirements of implementation evaluators, the sponsors found it was surprisingly difficult to define and effect replication. Sponsors had trouble setting goals by specifying, in the abstract, the essential elements of their models--what behaviors and events would take place in a classroom if a model were replicated there. Some sponsors also disliked working for fidelity at the sites where local staff members had developed their own versions of the models; such adaptations, which might work well, had to be classified as implementation failures under the HSPV design.

Like the technical-assistance approach of HSPV, another relatively recent approach to innovation has also given attention to the implementation phase. Some developers, perceiving the deficiencies of the RDDA model, now include in their products information packages that are intended to help with implementation. Since most of these developers have encouraged fidelity to a particular way of using the product, we show their strategy as in figure 5.

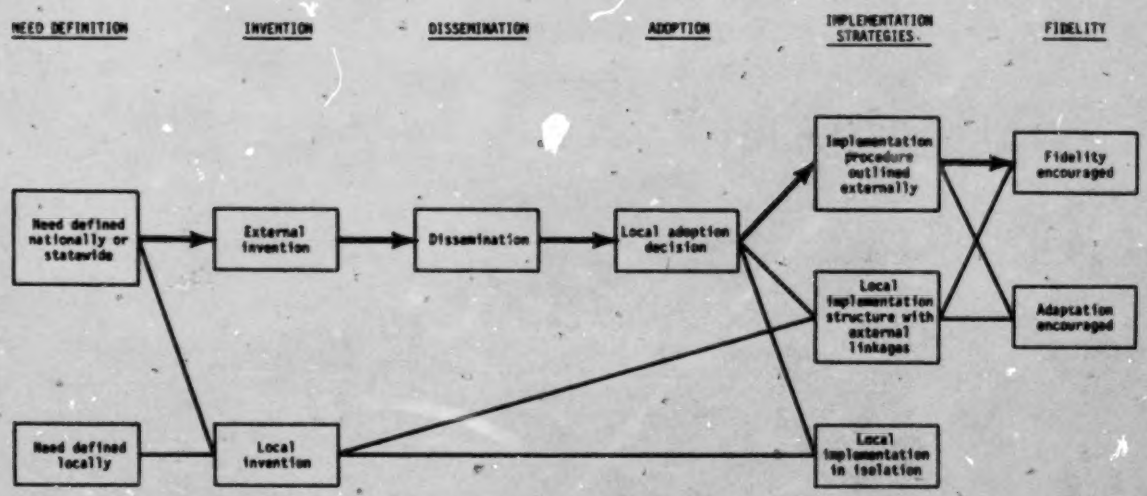

Figure 5 - A Model-Replication Approach (Project Information Packages)

One federal agency that has recently adopted this innovation strategy is USOE's Office of Planning, Budgeting, and Evaluation, which now offers school districts Project Information Packages. Designed to bring about widespread replication of the exemplary compensatory education projects developed in six school districts, the packages provide extraordinarily detailed guidance for adopting districts. Various components of the packages advise local people how to organize the project staff, what sort of planning meetings to set up, how to obtain or develop the materials they will need, and so on. An evaluation of the packages has not yet given difinite answers about the effects of this novel implementation mechanism.

We could chart other paths, those that have been tried and those we could invent. For example, additional paths open up if we consider the various iterative links which characterize some strategies (e.g., widespread dissemination of field test versions of external inventions) or the interactions which characterize others (e.g., developing "unfinished" products to serve nationally-defined needs). But the major purpose of this chapter has been to develop an analytic framework that clarifies the distinctions among very broad approaches to change. Clearly, no approach is purely centralized or decentralized, and we do not believe that such a simple dichotomy would be a useful basis for policy planning. We have tried to stress the need to scrutinize the way local and nonlocal responsibilities are divided in any approach. It is important to evaluate an approach according to <u>which</u> of these paths is being followed as well as <u>how</u> it is being followed.

Subsequent chapters of this report review in some detail what research and practice have established about the local change process, specific change strategies, and evaluation techniques. They do not address the broad policy

options alluded to here, but careful weighing of options at the level we have just been considering is a prerequisite to the effective use of the detailed, research-based information those chapters contain.

CHAPTER 2

ENVIRONMENTAL, ORGANIZATIONAL, AND INDIVIDUAL CONDITIONS AFFECTING INNOVATION

The outcome of a particular change strategy is conditioned by the setting in which it is applied. Thus, knowledge of user systems is important for planning, assisting, or evaluating change. In this chapter, we discuss environmental, organizational, and individual conditions which influence innovation.

Environmental Conditions Affecting the Success of Curriculum Change Strategies

The political, economic, and legal environment of schools in this country has profound implications for whether and how they adopt and use innovations. Although few such environmental conditions are directly set up by federal or other policymakers to stimulate innovation (an exception being the provision of incentives, such as funding, for innovation), it is important for would-be change agents to understand them. The conditions that surround schools form a structure of constraints that must be reckoned with and opportunities that can be capitalized on in encouraging innovation.

Public opinion at the local (community) level influences educational policy.

It is worth recalling the observation of Pincus (1974) that school administrators are unlikely to take any action that will upset community equilibrium. As public agencies, schools rely on electoral support, both for the bond issues that sustain them financially and in the re-election of school board members. Pressure from organized groups may govern the willingness of school authorities to adopt changes and the direction of changes adopted.

If a curriculum's material or style of presentation is controversial for some reason--for instance, if it permits students to question traditional societal values--groups may organize to bar its use in schools. Well-publicized controversies over changes in the curriculum have a predictable chilling effect on innovation. The clearest recent example of how community pressures may block change is the controversy over the program, Man: A Course of Study (MACOS), in which community objections halted not only adoptions of the course but federal appropriations for its promotion (New York Times, October 1975).

In the other direction, community support or pressure may promote changes. Nelson and Sieber (1976) found that "publicity value" is a more important innovation-attribute than either cost or educational value in determining innovation-adoption, and Berman and Pauly (1975) found that districts are significantly more likely to plan to continue innovative projects if their communities are complaining about student test scores. Community groups' support for particular innovations was among the variables studied in the Rand change-agent study, and one broad conclusion of that study is that political support is likely to be a significant factor in local administrators' decisions to continue implementing an innovation (Greenwood et al. 1975).

However, closer inspection of the Rand findings indicates that backing from certain elements in the community may be a two-edged sword, turning the effect around again, so that change is impeded. Bilingual programs sometimes became the focus of groups working for radical social change, and the nature of this support worked against the perceived acceptability of the program in some districts (Sumner et al. 1975).

A similar phenomenon could occur with a social science curriculum change if it became part of the agenda of a politically controversial group.

The nature of the controversy that may arise over a new curriculum will vary according to subject matter.

In social science, concerns are likely to center around the perspective a course takes in describing American history or contemporary society, or the amount of skepticism toward traditional values that it seems to encourage in students (Hahn 1976). In a survey in one district, Naylor (1973) found that parents and school board members were less tolerant than teachers of critical examination of American society. Williams et al. (1973) report that parents have more traditional values than teachers or administrators. Thus, when teachers have fears of negative community reaction to a new social science program, their apprehensions may be well-founded.

When the subject matter is science, a particularly volatile topic is human reproduction. When Individualized Science Instructional System (ISIS) staff notified trial centers that two trial units were considered sex education by some, two centers decided not to use the materials (NSF 1975). Similar experiences with the early Biological Sciences Curriculum Study (BSCS) materials are recounted by Grobman (1969).

Highly visible innovations, those comprehensible to laymen and publicized in the mass media, are the ones which will be most subject to community reaction (Nelson & Sieber 1976). Thus, social science curricula are probably more scrutinized and math curricula a bit less scrutinized than science curricula.

The implication of findings regarding the political environment of schools is that community support (or at least neutrality) can be crucial for innovation success.

However, change planners need to consider how to mediate informed community involvement, since studies occasionally suggest that the direction of community influence may not necessarily work to the betterment of education. Bridge (1976), in a discussion of parent influence, notes a possible reason: it is easier to organize for resistance than it is to organize for achieving long term positive goals.

National climates of opinion may also promote or extinguish curriculum innovations.

The relationship between national public opinion and educational innovation has not, to our knowledge, been systematically investigated. However, the National Council of Teachers of Mathematics (NCTM), in its thirty-second yearbook, discusses the development of mathematics innovations in response to historical periods and climates. Indeed, the "new math" appears to have gone through a "boom-bust" cycle in public opinion. (This is, however, an oversimplified view of a complex set of trends and countertrends) (NACOME 1975). It is widely believed that an event like the Soviet launching of Sputnik or the publication of Why Johnny Can't Read or Crisis in the Classroom precipitates a rush to innovate. Public opinion may also work against innovation due to its tendency to expect education to maintain the status quo. For example, the belief that social science education should inculcate patriotism has been noted as a barrier to the implementation of inquiry-oriented programs that seem to encourage skepticism toward traditional beliefs (Winn 1971, Naylor 1973).

Public opinion may powerfully affect education if it influences the governmental priorities affecting funding for innovative projects.

One effect of the fluctuation of public opinion may be to lend some instability to change efforts that depend on government funding. The

USMES (Unified Science and Mathematics for Elementary Schools) News reports their experience:

> Recent events in Congress appear to have drastic effects for USMES implementation activities . . . unless other sources of funding can be found, there will be no [USMES workshops] . . . these views are in sharp contrast with the past urgings of Congress that the Foundation ensure that NSF-funded elementary and secondary curricula programs are used. . . . (October, 1975)

A case study by Popkewitz (1975) shows how federal funding policies can have the effect of altering the original priorities of a change program (in that case, the effect was to destroy the essential innovative aspects of the program). McLaughlin (1976) notes that local school people view federal support as unstable.

The relationship between schools and the public provides administrators with more incentives for cosmetic changes than for fundamental ones.

Unlike a profit-making organization, a school does not have a clear "bottom line" to demonstrate the advantageous outcome of an innovation. Instead, school administrators are likely to worry less about goal attainment than about maintaining the delicate relationship with their diverse clientele (Miles 1965, Sieber 1968, Nelson & Sieber 1976). Pincus (1974) points out that a school system is not market oriented in the same way that a commercial firm is, but that it faces important pressures from consumers nonetheless. He characterizes the typical school system in this way:

> . . . a self-perpetuating bureaucracy [which] . . . is open to a good deal of public scrutiny on issues having to do with perceived equity, quality, and goals; . . . cannot unambiguously define its aims or clearly identify technologies . . . its governance is highly decentralized, yet subject to a wide variety of influences, so that each unit perceives itself as facing a unique configuration of clients and masters.

Pincus suggests that schools will adopt innovations that enhance their public image by demonstrating that they are "up-to-date," "efficient," "professional," and "responsive." Because the schools have an unclear production function and an emotionally charged relationship with their clientele, they are unlikely to implement profound changes that threaten to upset stability for an uncertain payoff. Cosmetic changes, on the other hand, may offer public relations value. And it is important to note that schools can often gain good public relations by proclaiming their adoption of innovations--whether or not these are actually implemented. Havelock and Havelock (1974) call these "showcase innovations."

Another environmental factor, teacher unions, may come to have considerable influence on whether and how curriculum change occurs.

Orrange and Ryn (in Edelfelt & Johnson 1975) discuss the increasing size and power of teacher organizations:

> Over the past decade, teacher organizations have grown in size, political sophistication, and professional awareness, increasing the involvement and impact of the individual classroom teacher in every aspect of education affairs. Collective bargaining now allows teachers to exercise control over . . . curriculum development, evaluation procedures, class size, and organizational improvements. . . .

Cheng (in press) also points out how wide ranging the issues now may be in collective bargaining with teacher unions, and he goes on to call attention to the parties other than teachers who have an increasing role in setting district policy. With the growth of bargaining in education, high-level union officials and "third-party neutrals" have come to exert a great deal of influence.

The strength of local teacher organizations and the power structure in bargaining may have various sorts of effects on implementation. For example, some teacher organizations have included inservice training

provisions in their bargaining packages (Edelfelt & Johnson 1975). Since such training seems important in facilitating change, it might appear that the net effect would be more effective implementation. However, if high-level union officials and third-party neutrals are not attuned to the wishes of rank-and-file teachers, a new program of mandatory inservice may create more antagonism than constructive change. Many teachers may participate in the new program, but others may stay away because of colleague pressure or ideological stance.

Teacher unions may also increase teacher participation in decision making for innovation. This may work to preserve the status quo or at least decrease the adoption of particularly threatening changes. However, active participation in decision making may make teachers more amenable to otherwise threatening changes by increasing their involvement, skill, and understanding vis a vis the change.

In some cases, a teacher organization may directly hinder change efforts. An innovative program may not be widely used because it would violate local contract provisions regarding overtime or would incur too much expense associated with training teachers during the normal workday or paying them for overtime. Unions may serve to enhance the resistance of individual teachers. Commenting on the implementation of a Rhode Island social science program, Risinger and Radz (1971) note that the project met with high school teachers' opposition and therefore union opposition: "Unions, which are strong in this urban center, resist both the expense of moving to new materials and the demands on teachers' time that accompany innovation. . . ." Rand researchers, on the basis of their case studies of projects in staff development, trace such problems to the traditional union concern with its members' working conditions. They say that teacher unions are "unlikely to

endorse changes in teacher working conditions, self-determination, or workload" and that resistance to such innovations may be insuperable in a city where the union is strong. And if a union is not yet strong but is trying to become so, its resistance may be quite militant (Mann et al. 1975).

Although teacher organizations have recently broadened their concerns beyond bread-and-butter issues, salaries probably remain their primary interest. In a time of recession and strained city budgets, strong unions are working to keep teachers' salaries as a high-priority budget item, thus leaving less money available for the adoption of innovations. Budget struggles can have other, indirect effects on innovation implementation by causing antagonism between teachers and administrators or the community; since implementation ultimately requires cooperative relationships, this antagonism can be harmful. Meanwhile, there is a trend that may erode the power of the teacher unions: public officials, counting on taxpayer votes more than those of union members, are taking stiffer stances to union strike demands (New York Times, September 28, 1975).

There are some more indirect ways unions may influence the success of change efforts, such as by augmenting the number of teachers who have many years of classroom experience. As the student population declines, there are fewer teaching positions and less job security. If teacher unions work to keep their members employed, preventing districts from replacing teachers who are at the top of the salary scale with first-year teachers, the demand for new teachers will be held to a minimum. Strategies which employ preservice training to fuel change will thus be ineffective.

Another environmental influence comes from the adoption of curriculum materials at the state level.

Thirty-three states now select materials for statewide use, although fourteen of them make multiple adoptions and thus give local districts some choice (Rosencranz 1975). Over 40 percent of the students in the country go to school in "adoption territory" (EPIE 1976).

Reviewing state criteria for the materials they adopt, Klein (1976) reports emphases on practicability and desirability. Practicability criteria include the amount of required training, the product's adaptability, evaluation components, and price. Desirability criteria tend to center around the product's reflection of American ideals and its likely acceptability to sensitive sectarian groups. Indeed, Rosencranz (1975) concludes that state adoption favors innocuous materials that bring little risk of adverse reaction.

A criterion area that has recently increased in importance is that of social fairness: materials must include fair representation by sex and race and portray a diversity of cultures, religions, occupations, and lifestyles (Klein 1976, Rosencranz 1975). In California, a new committee of community representatives reviews materials for their conformity to this requirement. Early experience showed that many submitted materials could not meet the social fairness criteria, but informal negotiations between the state adoption committee and the publishers resulted in changes and eventual acceptability.

Although a few years ago Reutter (1970) foresaw few changes in state adoption practices, recent changes in California may be a harbinger of coming trends and thus deserve some discussion here. Because California now has such a complicated adoption process--involving, besides the committee of community representatives, hundreds of committees and

subcommittees of educators--publishers find it a difficult and expensive state in which to do business. They are often asked to change their materials to meet California's wishes, for instance by presenting the theory of evolution as only one view of humanity's origin. And, whatever the formal criteria and procedures for state adoption may be, dissemination specialists report that their informal lobbying is likely to be critical. One editor at a large publishing company emphasizes the importance of keeping close contact with adoption committee members, since they are confronted with an enormous volume of materials and cannot give every product equal attention. Since the state adoption is only one hurdle and individual districts are then free to make choices among the adopted materials, publishers are wondering if the California market is worth the effort (Rosencranz 1975).

Teacher involvement in adoption decisions may have interesting effects on selection and dissemination techniques.

The California Education Code also requires teacher involvement in selecting materials; display centers around the state facilitate such involvement, and the Department of Education has produced a guide to help inform schoolpeople about the new selections. If teachers are involved, publishers must not only work with a few decision makers--state adoption committee members, administrators, and curriculum specialists--but must also inform teachers about their products. A few publishers' representatives with whom we talked were negative about teacher involvement in curriculum selection; teachers are not, and do not have time to become well informed about options, they generally agreed.

If each teacher in a school makes an individual decision, publishers do not have a monopoly over a school or district. Not only is it likely that sales are lessened as many smaller competing firms enter the market, but assistance becomes more costly because teachers using a particular program become more geographically dispersed. As teachers learn of new programs, and because of the high price of some materials, it becomes more likely that teachers adopt only segments of programs--piecing together a number of programs rather than making a single adoption. Publishers would obviously rather sell a complete series than one sample text from which the teachers will select relevant materials.

With or without state adoption, all states have laws that influence curriculum change efforts.

State laws mandating that particular topics be included (or avoided) in the curriculum have an effect on the implementation of new materials, particularly in science and social science (Duet et al. 1976). It may be necessary for a science course to cover health and hygiene, safety, the dangers of alcohol and tobacco, and so on (Brown & Brown 1969). And for social science in 1961 the Florida legislature prescribed that every public high school teach a thirty-hour course entitled "Americanism vs. Communism" stressing the advantages of the American economic system and the dangers of Communism (Naylor 1973). Such state laws change the scope of local discretion in science and social science curricula. In New York, local discretion in all subjects is reduced by the Regents' curriculum guides, which prescribe course content in detail.

An analogous, though slightly subtler, influence reaches schools in the form of legislative "accountability" requirements. Where pupils must attain certain skills in order for state funds to flow to their districts, school staff will naturally be attentive to the attention that curriculum

materials devote to these skills. At least thirty states have recently formulated goals or objectives in mathematics (NACOME 1975).

Some states now require that curriculum materials undergo a process of "learner verification." As defined by the EPIE Institute (1975), learner verification does not result in any guarantee that instructional materials will produce particular learning outcomes. What the process entails is simply field testing the materials with students and teachers at some point in product development and then making whatever revisions developers consider appropriate for the materials.

In addition to the laws dealing with curriculum content, state laws controlling teacher certification and recertification may mandate certain types of teacher training. For instance, a report on mathematics observes that recertification requirements frequently obligate teachers to participate in inservice courses that offer training in new methods or programs (NACOME 1975).

Some federal laws affect the needs or resources of districts, while others directly affect curriculum development and dissemination.

By bringing students with diverse cultural and educational backgrounds into formerly homogeneous schools, desegregation has affected those schools' curriculum needs. Some districts have desegregated in response to federal court orders, while others have taken voluntary action in the wake of such decisions as Brown v. Board of Education. In either case, a constitutional issue has had indirect effects on the curriculum. For example, the problems of teaching children of widely ranging achievement levels in newly desegregated classrooms have helped promote the reform of mathematics curricula by increasing the tendency to use individualized materials

(Devaney & Thorn 1974). And with an increased sensitivity to the way minority groups are portrayed in curriculum materials, many districts are setting up new screening procedures (Beckum et al. 1975).

While the federal judiciary has been altering the clientele of some schools, the Congress has provided new resources for many schools. Title I of the Elementary and Secondary Education Act, for instance, has added considerably to the money districts can spend on "educationally deprived" students in low income areas. The availability of Title I funds has stimulated something of a boom in compensatory-education materials. Other programs of categorical funding have operated on a smaller scale but have also contributed to various specialized markets for educational materials. A problem that sometimes arises in districts with special-purpose federal money is that only certain personnel can be trained with this money: thus a broad program of staff development to accompany a new curriculum might have to be partly funded by the district itself (Edelfelt & Johnson 1975).

Curriculum development and dissemination are also affected by laws. For example, the Elementary and Secondary Education Act and the National Defense Education Act stimulated much development. Once curricula are developed with federal dollars, they customarily receive continued funding for dissemination--subject to various restrictions. Federal regulations concerning copyrights and dissemination activities have influenced implementation. This was true in the 1960s, when the developers of Biological Sciences Curriculum Study hesitated to do more than answer queries about their program (Grobman 1969), and a low-key approach appears to be in favor again today. In a case study of one science project an NSF review team noted that funds could be used for the dissemination of information about a curriculum but not for promotion or

distribution of materials, on the grounds that the latter activities would infringe on the state and local authority to select materials (NSF 1975).

Federal agencies have sometimes worked directly with school districts to enroll them as users of particular innovations. Examples of such federal efforts are the "planned variation" programs in Head Start and Follow Through (Rivlin & Timpane 1975) and the experiment in performance contracting (Gramlich & Koshel 1975, Carpenter-Huffman et al. 1975). In all these cases, the primary purpose was to conduct a controlled field trial of the outcomes of innovations, but the federal sponsors encountered unexpected complexity in the process of implementation in the field sites. In retrospect, studies conclude that the sponsors thought implementation could occur in an unrealistically short time, and it may be that the resulting sense of urgency impaired implementation (Fullan & Pomfret 1975).

Organizational (School and District) Conditions Affecting Innovation

Variable conditions characteristic of schools and districts determine the nature of innovative processes in those organizations. Efforts to facilitate adoption/implementation may attempt to modify the conditions and/or to capitalize on knowledge about them. For example, where effective use of a curriculum development requires collaboration among administrators, parents, and teachers, techniques of organizational development may be used to set up collaborative structures prior to introducing the innovation, or the innovation may be selectively introduced, i.e., only to school systems which already have mechanisms for collaboration.

Either approach presupposes knowledge of the organizational conditions which affect innovation. Important conditions to consider include decision-making structures; leadership, and change role influences;

communications networks (linkages and organizational climate); and demographic influences. These are areas of considerable overlap, and each subsumes a number of more specific and often contradictory influences. A tentative summary profile of the innovative school organization would be as follows: It has a participative decision-making structure, whose formal and informal leaders provide clarity, direction, and support for change efforts and whose change participants are committed and competent. It has open communication and feedback, externally and internally, i.e., relevant linkages to external resource systems and an internal incentive structure or climate which promotes--or at least does not impede--risk taking, goal review, information sharing, good interpersonal relations, and organizational flexibility. Demographically, it has sufficient wealth and material to support innovation. These conditions are discussed below.

<u>While evidence is mixed regarding the nature of the relationship, it is clear that decision-authority patterns importantly affect the likelihood and success of curriculum innovation</u>.

It is clear that decision-making structure is one of the most important organizational variables affecting innovation. What is less clear is <u>how</u> it affects innovation.

Organizational decisions may be made at top authority levels (centralized structures) or arrived at by groups representing many or all organizational levels (decentralized structures). Some research has shown that decentralized decision-making structures favor the initial adoption of curriculum innovations, but authoritarian, non-participative structures favor sustained adoptions, or implementation (Baldridge 1974; Deal 1975; Zaltman et al. 1973, 1977). It appears that innovations may more easily penetrate boundaries of decentralized systems, where

individuals at all levels have authority to explore innovations, but that sustained use may be better facilitated where there are clear authority patterns.

Other research evidence contradicts these findings. Decentralized structures have been found, relative to more centralized structures, to inhibit adoption but facilitate use of adopted curricula (Miles 1974, Havelock 1974, Turnbull et al. 1974, Berman & McLaughlin 1975, Fullan & Pomfret 1975).

More careful analysis of the key independent, intervening, and dependent variables helps to resolve these contradictions.

First, it appears that there are several dimensions of decision-making structure which influence innovation. Zaltman et al. (1973, 1977) isolate formality, centrality, and complexity as crucial dimensions and show that in their effects the first two are the same as each other but they are different from the third. Briefly, centrality and formality favor implementation but not adoption; complexity favors adoption but not implementation. Thus, a decentralized but formal structure may have conflicting effects, while a decentralized, informal structure will probably not. These researchers also identify two other dimensions which make a difference--good interpersonal relations (favoring both stages) and ability to deal with conflict (favoring both stages).

For educational organizations, probably the key dimension, and thus the key independent variable in considering the relationship of decision-making structure to innovation, is the centrality dimension, i.e., extent of participation in decision making by the ultimate users--in particular, teachers. The important structural characteristic is sharing of the decision-making function with the ultimate user. (Other terms in the

research literature which describe such structures include "leadership sharing" [Schmuck et al. 1975] and "differentiated" structures [Bredo & Bredo 1975, Coughlan et al. 1972, Cooke et al. 1974]). However, variables such as intrastaff conflict and innovation-complexity intervene to complicate the relationship between participation in decision making and innovation adoption and use.

As participation/collaboration is increased, system boundaries may be more penetrable, favoring adoptions. However, if there are intrastaff differences, consensus may be more difficult to achieve, thereby *hindering* adoption.

Participative decision making will generally favor innovation-adoption. However, if serious intrastaff differences exist, participative decision-making structures may foment conflict, with the effect of inhibiting adoption. Thus, while some investigators have found that the complexity and differentiation of many participative structures allows innovations to easily "slip through," Fullan and Pomfret (1975) present evidence for the implication that ". . . if adoption . . . was the main initial goal, it would be more effective to minimize participation under certain circumstances . . .," i.e., where there is potential for conflict among participants. And Firestone (1976) notes how the conflict generated through participation of parents in decision making can be destructive for parent-run free schools.

Thus, authoritarian decision making can obviate disagreements which might otherwise prevent particular adoptions.

However, while goal-conflict may preclude the consensus necessary for adoption by a participative structure, the glossing-over of such conflicts through an authoritarian approach can cause problems later. Many researchers are now arguing that conflicts should be aired and confronted early, since change implementation cannot be optimal until this happens (Mann 1976, Manning 1974, Sieber 1975, Popkewitz 1975).

As regards implementation, authoritarian structures may appear to be effective since they can mandate and coordinate the actual use of new curricula. However, this assumes that proper use-behavior is explicit and easily communicated.

If the behavior to be implemented is relatively simple and can be easily communicated to users, authoritarian structures can promote more rapid change by mandating it and mobilizing or preempting resources to support it (Fullan & Pomfret 1975, Zaltman et al. 1977). In fact, where the innovation is highly explicit, to the point of being "teacher-proof," a mandate may be the only way to get change, since such materials are often resented and resisted. (However, the mandate itself may generate resistance, undermining even an explicit well-defined curriculum in subtle ways [Knight & Gorth 1975, Hall & Rutherford 1975, Zaltman et al. 1973, 1977].)

Where the innovation is complex and thus not explicit, user-commitment and capability are necessary, and these appear to depend on meaningful user participation in decision making.

If the innovation is not explicit--and most educational innovations are complex--implementation depends heavily on committed users with certain abilities and skills. The quality of user participation in decision making relevant to innovation will affect the extent of user commitment and capability. Thus, effective implementation requires a quality of participation such that users develop a commitment to the change and improve in their abilities to perform new roles (Fullan 1973, Lippitt 1974, Sikorski 1975, Fullan & Pomfret 1975).

Presumably, rubber stamp agreement is insufficient for mediating commitment and capability; however, researchers have not yet determined the aspects of participation which are important. Fullan and Pomfret (1975) point out that participation may occur at different stages in the decision making process or for different kinds of decisions, to different degrees, and involving differing numbers of users. Although we do not yet know exact forms participation should take, it is probable that all of these dimensions are important. Undoubtedly, there is no one optimal form of participation. The nature of the innovation may partially determine what decision-making structure is appropriate, as evidenced by Wacaster's (1973) study of a school where those proposing a change to hierarchical team teaching instituted participative decision making in order to pave the way--only to find that the innovation was unwelcome to teachers who were learning to dislike hierarchical authority patterns.

A discussion of the influence of decision-making structure also requires a careful conception of what the dependent variable is.

"Implementation" may refer to having materials on a shelf in the classroom, or to using them according to a set of rules, or to interacting with them to develop a unique teaching/learning process. Authoritarian decision-making structures can facilitate simple or "cosmetic" uses, but participative structures are needed to promote real change. As noted above, meaningful change through innovation probably requires more of users than their adherence to a set of commands. In fact, some researchers have concluded that adaptation or modification of both the product and the user is the key to meaningful change (Berman & McLaughlin 1975, Fullan & Pomfret 1975, Parkay 1976, Argawala-Rogers 1976).

Some developers require that all affected groups be involved in adoption decisions, and this may be a useful strategy for effective implementation.

As an example, recognizing the importance of collaborative planning, developers of IGE impose the constraint that it cannot be adopted until all concerned groups, from teachers to community members, have indicated their willingness to work for the change.

Some researchers have offered suggestions for retaining a participative organizational structure while avoiding some of the hurdles it poses.

This is an argument for promoting change by improving planning capabilities in schools. Baldridge (1974) has suggested that the possible conflict and lack of coordination in participative structures can be relieved by assigning together the usually-separate functional responsibilities for innovation-adoption and centralized coordination. In the same vein, Zaltman et al. (1977) suggest that change planners may wish to consider special organizational designs: in schools with participative decision-making structures, "change teams" could be used to set guidelines and procedures for easing implementation problems. Zaltman and Duncan (1976) discuss the use of "switching rules," which involve temporarily making an organization structurally different at the time or stage where a particular structure may adversely affect the innovation-stage. For example, if decentralization of authority makes implementation of change difficult, then authority could be delegated to a higher level committee for the purpose of coordinating a particular change. At other stages, the normal authority pattern would be reestablished.

Some research suggests that school systems will be more innovative if they establish a change agent role as part of the organizational structure.

The time and effort required to initiate and monitor change is not readily recognized. In fact, it is usually at the price of accomplishing objectives more traditionally acceptable (Knight & Gorth 1975). Pointing out that incentives for change are seldom present in schools, researchers argue that if the role of change agent becomes institutionalized, the incentives will shift in the direction of innovation (Carlson 1965, Gallaher 1975, Baldridge 1974, Knight & Gorth 1975).

A science coordinator, while not explicitly designated as a change agent, seems to serve that role in many school systems (Whitla & Pinck 1973). In many districts, the superintendent takes on an active gate-keeping role, introducing and promoting changes (House 1975).

It may be that an internal change agent role should involve person(s) not immediately accountable for the outcome of the change effort.

A caution regarding internal change agents is offered by Miles (1965) who notes that although absence of a change agent in school systems inhibits innovation, when the role is performed, usually by the superintendent, its objectivity and effectiveness may be limited.

The innovativeness of an organization is also a function of the capability and motivation of its members who must implement change.

We have said that participative decision making structures are important for getting participants involved in and familiar with an innovation. It is also true that school organizations depend on these qualities of individual motivation and competence for effective implementation of complex innovations. This includes competence in planning and communication skills as well as in specific instructional methods.

On the issue of motivation, Bredo and Bredo (1975) note that participation itself will be a function of interest and available time. Meaningful participation can be encouraged and facilitated, but for those who do not have the interest or time for it, change may be difficult and dysfunctional. They observed that teachers in social science departments are more inclined to participate than teachers in science and math departments, and because of this, interest among social science teachers in a particular innovation was greater. Their suggestion is that better planning capabilities and improved leadership are needed in both kinds of cases, but with social science teachers they are needed to resolve conflicts while with math and science teachers they are needed to increase communication and participation.

As regards competence, it is now widely believed that to train teachers and other change participants in new instructional methods is insufficient, that they must develop skills for working effectively with others in an organizational context (Zaltman et al. 1977, Schmuck et al. 1975). This includes planning and communication skills and skills for group problem solving.

Staff quality can be improved through formal training, but it also depends on external and internal communications functions.

Research has shown that external contact and linkages to the outside environment are characteristic of innovative organizations (Tempkin 1974, Baldridge 1974, Deal 1975). This is in part because such organizations are more in tune with what new things are happening; additionally, they are in touch with resources and expertise which may be lacking in the individual system (Havelock 1974, Stiles & Robinson 1973). The concern with developing and improving linkage systems to break down isolation

is partly a mechanical problem, one of setting up communication channels. But it is also a psychological one, since practitioners in many areas have institutionalized isolation, using it for protection (Pincus 1974).

Schools and districts may have a more or less favorable "climate" for change, due to their incentive structures and quality of intrastaff relationships.

Researchers continually point to the lack of positive sanctions for creativity coupled with intolerance for mavericks which inhibits innovation in schools (Zaltman et al. 1977, Stiles & Robinson 1973, Rogers 1976). Innovative school systems are generally found to have open communications, horizontally and vertically (Manning 1974, Hall & Alford 1976), with incentives favoring innovation and risk (Zaltman & Duncan 1977 [in press], Zaltman et al. 1973).

Intrastaff support and exchange, both horizontal and vertical, are found to be important (Berman & McLaughlin 1975, Manning 1974, Cooke et al. 1974, Edelfelt & Johnson 1975). Morale is important, and provisions for sharing resources and ideas can be used to great effect as far as helping promote acceptance and use of new curricula.

Another aspect of organizational climate, flexibility, is important for organizations adopting new curricula.

During the initial stages of user-implementation, when an innovation is most vulnerable, its lack of congruence with the rest of the curriculum should be analyzed and dealt with. That is, it must be kept in mind that the innovation is entering an established organizational setting. If it remains incompatible with that setting, i.e., if the setting and/or the innovation do not change, successful implementation is very unlikely

(Rogers & Shoemaker 1971, Turnbull et al. 1974, Wirt 1976). Cowle (1974) discusses this problem in relation to the new mathematics curricula of the early 1960s, pointing out that some texts were only available for the primary grades, different texts were used in different systems and sometimes within the same building, and some children had to face the new curricula after years of conventional math instruction. All these circumstances contributed, he says, to widespread confusion on the part of children, parents, and teachers. While some confusion may be inevitable as incremental change takes place, local staff and their outside helpers should recognize its likelihood and plan accordingly.

Certain demographic characteristics are correlated with adoptions of new curricula.

This includes size (Deal et al. 1975, Baldridge 1974, Berman & Pauly 1975); location operationalized as environmental heterogeneity (Baldridge 1974, Berman & McLaughlin 1975) and as opportunity for interaction (Havelock 1969, Fullan & Eastabrook 1973, House 1974), past experience with innovations (Widmer 1975, Baldridge 1974, Deal 1975, Berman & Pauly 1975), and wealth (Mort 1964, Berman & Pauly 1975).

Such variables are sometimes associated with others which have greater explanatory power. For example, size relates to complexity and linkages; location relates to linkages; and school systems with high capacity in one area, e.g., wealth, are usually the systems with high capacity in other areas, e.g., sophistication, education, size, status, etc.

Further, the importance of particular demographic variables is often situation-specific. For example, Kester (1976) reports a relationship between ethnicity and response to a career guidance innovation--a relationship showing a more active involvement by Black faculty. This

is consistent with reports that Blacks are understandably more concerned with the accountability of school counselors, who serve as crucial gatekeepers for Black students' future education and employment opportunities (Sikorski et al. 1976, Featherstone 1976).

Because the effects of demographic variables are so interrelated and situation-specific, they are usually not singled out as consistently important. However, the variable of wealth has been of special interest, since it has prima facie importance. Other things being equal, the wealth or "risk-capital" at the disposal of the school organization can greatly facilitate change. It should be noted, however, that wealth includes human as well as material resources, and money alone is often not useful for prediction. Schools with sufficient capital may still fail to implement changes, and cost of change may not be a barrier if some other more important variable favors adoption of a new curriculum. For example, confirming earlier speculations by Pincus (1974), who argues that schools are more likely than commercial firms to adopt cost-raising innovations, Nelson and Sieber (1976) find that political value of an innovation overrides considerations of cost.

Still, innovation is seldom inexpensive, and the high cost of change is often reported as an impediment (Turnbull et al. 1974, Sikorski & Hutchins 1974). Many new curricula demand a larger investment than the textbooks they replace. This seems to pose a serious problem in elementary science, where the average per pupil spending for materials was less than $1 a year in Massachusetts, yet the NSF-supported systems could cost around $3 (Whitla & Pinck 1973). The problem was compounded by the fact that other subject areas--reading in particular--had higher priorities in the districts. Certain change efforts are inherently too costly to be

easily supported by any single school or district. (See, for example, Rogers [1976] who voices this concern in reference to teachers' centers.)

Schools and districts may be hampered by inadequacies of materials and equipment.

The mundane issues of obtaining, storing, and distributing special materials and equipment can loom large during implementation of an innovative curriculum. Although developers often include unfamiliar media in their products, experience shows that if implementation depends upon a piece of equipment like a videotape recorder, the innovation may be abandoned (Turnbull et al. 1974, Sikorski & Hutchins 1974). In elementary science programs, users have reported difficulty in maintaining and dsitributing the necessary materials and equipment (Whitla & Pinck 1973, Anderson & Horn 1972). This problem is especially evident in one of the programs which includes both plants and animals (NSF 1975). School principals are also disturbed to find that their facilities are inadequate for implementing the new curricula, since they lack such necessary features as storage space, sinks, etc. (Whitla & Pinck 1973).

Conceptual resources for using innovative curricula may also be lacking and thus hinder change. For example, new curricula often require innovative assessment methods, without which school personnel cannot monitor change (De Rivera 1974, Peck & Jencks 1974, Perrone 1975).

The Individual As A Factor In Change

As noted earlier, the course of change is importantly influenced by the staff of the school organization. This section reports findings on circumstances in which characteristics of individuals facilitate or block change.

It is impossible to consider the success or failure of an innovation apart from the nature of the principal and his teaching staff (Parkay 1976). In general, the most crucial roles in change are played by principals and teachers. Other school administrators, community representatives, and external change agents are important in particular cases, but it is principals and teachers who ultimately implement change. And if it can be said that the student ultimately determines success (Fullan 1972, Charters & Jones 1975), it can also be said that it is mainly principals and teachers who are closest to those students and who determine the character of the treatment students receive. Accordingly, much of the research on individuals in the change process has studied principals and teachers.

The school principal can be a critical force in facilitating innovation.

His/her leadership style, support, and own change-orientation importantly influence the course of change (Anderson & Horn 1972, Barth 1972, Devaney 1974, Berman & McLaughlin 1975, Chesler et al. 1975, Schmuck et al. 1975).

Innovations have a greater chance of success in schools where the principal encourages open communication and sharing in decision making.

Parkay (1976) writes that in schools contemplating change, it is incumbent on the principal to "foster good group processes by allowing his faculty to share meaningfully in the decision-making process . . . develop a climate characterized by an authentic spirit of community and open honest inquiry . . ." and have a professional rather than paternal attitude toward teachers. Schmuck et al. (1975) report a similar leadership style for principals of innovative schools.

Innovation is enhanced in schools where the principal's attitude toward change and those who want to change is supportive and encouraging.

A recent study of California schools isolates the principal's support for risk taking as crucial for change in mathematics instruction (Allen 1975). Principals do not have complete control over material incentives for teacher performance, but they do set the tone for less tangible incentives, and these may be even more important (Greenwood et al. 1975).

It is the principal who can be pivotal in fostering the kind of climate where teachers perceive that professional or psychological rewards will accrue (Mann 1976).

A principal's own desire for change and participation in change can greatly facilitate the effort.

Implementation strategies for Individually Guided Education and Technology for Children incorporate the active participation of principals (Turnbull et al. 1974). Schmuck et al. (1975) find that principals can be important as models for other participants in change. Researchers note the necessity for teachers being able to turn to their principal for guidance and assistance (Berman & McLaughlin 1975, Anderson & Horn 1972).

Science coordinators surveyed by Whitla and Pinck (1973) complained that principals who did not help teachers plan or improve the curriculum were a hindrance to change.

The principal's support may depend in turn on support from other administrative levels or from his or her ability to maneuver effectively those levels.

Researchers have found district level administrative support (or a "flexible administrative approach") to be an important facilitator of change (Gross et al. 1971, Baldridge 1974, Berman & McLaughlin 1975, Schmuck et al. 1975). Where principals do not themselves support change, it may be due to their own feelings of impotence in a school system where such administrative support is not perceived. Rogers (1976) writes that principals usually do not have autonomy and ". . . most often function as school managers, leaving truly professional decisions to those higher up . . ." Reporting on the Department of Elementary School Principals' nationwide survey of 2,318 principals, Devaney (1974) writes that principals "do not act as teacher educators, . . . do not control hiring of staff . . . do not control school budgets . . . and do not shape their own instructional programs." They (the principals) replied that they could "modify and adapt" the district curriculum plan (54 percent), "exert some influence" (40 percent), or "follow closely" (6 percent). Among principals in districts larger than 25,000 pupils, 41 percent said they worked with staff "to list the instructional materials needed for our program," while 59 percent had to accept what the district provided (see also The Education Digest, May 1976).

Administrative support may work to return discretion to principals, but obviously it frequently does not. Thus, change may depend on a principal's ability to "get past" his functional limitations. Devaney (1974) writes that "an understanding of the central office is, in fact, indispensable for the

principal of an innovating school, for principals are caught in the middle between teachers and parents--and the district bureaucracy. They must know district politics and personalities. . . ."

The characteristics of the principal and of individuals in other formal or informal leadership roles influence the innovativeness of school organizations.

Research reported by Manning (1974), Havelock (1969), Zaltman et al. (1977), Fullan and Pomfret (1975), Hall and Alford (1976), and Carlson (1965) shows that in organizations whose leaders have more experience and education, tend to high social interaction, and are supportive of others involved in change, greater numbers of innovations are adopted (although, as Fullan and Pomfret point out, it is not really known if this is necessarily followed by effective implementations). Further, a change to new leadership often injects innovative zeal into a school system (Carlson 1965).

Although they are sometimes excluded from playing an important role in the initiation and adoption phases of change, teachers are crucial in the success or failure of implementation.

Parkay (1976) writes that "change must begin with what the teacher does . . . [they are] the real innovative 'experts'. . . ." And, in fact, research supports this notion. Teacher resistance can be fatal to change, and teacher support of an innovation is an important facilitator (Nygren 1976, Yegge et al. 1971).

In a Massachusetts survey, elementary science coordinators named teachers' fear of science and their reluctance to try new methods and materials as "great hindrances to innovation"; a majority of principals said that these teacher characteristics were "some hindrance" (Whitla & Pinck 1973). Winn (1971) points out that traditional patterns of teaching, inculcated through rigid preservice training, may have become an integral part of a teacher's professional self-image and thus may block the

implementation of new approaches, for instance inquiry methods in social science. Or enthusiastic new teachers may be re-socialized to take on traditional ways.

Acceptance and use are favored where the teacher feels the change is consistent with his or her day-to-day activities.

If given the opportunity, teachers probably will select programs that look easy to teach. One publishing house editor stressed in his conversation with us that teachers are particularly sensitive to features of innovations which will exacerbate the serious demands on their time. And resistance may be due to teachers' very legitimate objections to a change which is not right for their immediate situation. Gross et al. (1971) and Smith and Keith (1971) report research showing that teachers who are willing and even eager to change may be stymied by practical problems. Some specific research shows how an inappropriate change can dishearten teachers. Reporting on a failed change effort in an inner city school, Parkay (1976) notes that the ". . . teacher is apt to view any change proposal which fails to confront his brutal reality . . . as adding to his frustration and sense of powerlessness."

When teachers' beliefs harmonize with those of a curriculum's developers, they are more likely to implement that curriculum effectively.

Devaney and Thorn (1974) note the importance of congruence between teachers' and developers' beliefs about children's thinking. There is wide variation in the approaches of project developers: though they may all agree on the common goal of teaching children to think, some programs call for preconceived, ordered, spelled-out lessons, strongly directed by the teacher, while others believe students should be led to make choices, explore, improvise, make mistakes, and learn from them. A teacher's

understanding of and agreement with the developer's point of view about children's thinking probably strongly influences his or her implementation of the program.

Rand researchers also stress the importance of philosophical agreement between developers and implementers:

> If the values and goals implicit in a project's design were not congruent with those of project participants, the innovation was likely to be either symbolically implemented or not implemented at all. . . . This appears to be particularly important when the proposed innovation represents a major departure from standard district practice. (Greenwood et al. 1975)

And an interesting study by Hoy & Blankenship (1972) reveals the association between beliefs and acceptance of a new science curriculum: teachers who used and liked the BSCS Biology Program tended to be more humanistic in their "pupil control ideology" than the teachers who rejected the program, although both groups of teachers had gone through the same inservice training.

Thus, involving teachers in decision making, or turning the authority over to them, can help insure that the change itself is (1) reasonable and appropriate to the reality they face, and (2) one they believe in. Supportive teachers will be more motivated to acquire new skills and behaviors necessary for successful implementation.

Teacher competency is crucial to successful implementation.

As mentioned several other places in this report, teacher competency to implement change is pivotal. Where it exists, change is facilitated; where it does not, change is hindered (Fullan & Pomfret 1975, Berman & McLaughlin 1975, Gross et al. 1971). Teachers who feel competent are also often eager to try new ideas and less likely to be threatened by and resistant to them (Knight & Gorth 1975, Havelock 1969).

Teacher competency vis a vis innovation is a subtle matter. It may derive from a general level of skills in planning and management, it may be skill to implement a particular change, or it may be a natural consequence of interacting with and using the innovation in question. Training programs may address the first two; the third is less amenable to training, but researchers have described stages through which the process may evolve.

The implementation process that teachers go through involves several "stages" characterized by different concerns.

Researchers at the University of Texas R&D Center describe developmental stages of concern that users, including teachers, move through as they implement an innovation (Hall & Rutherford 1975). Stages move from focus on self, to task, and to impact. They see implementation as a process "in which concerns of the adopter and relationship of these concerns to the use of the innovation play a major role" (Hall 1974). At first, they say, users focus on how an innovation will affect them personally. Next they pay more attention to managing their tasks; after these concerns are resolved, they focus more on the innovation's impact on students. Viewing the change process as a series of stages in which users have different concerns, these researchers urge long-term support to promote user growth, with varying strategies for this support corresponding to the stages users are experiencing.

Other research reinforces these views. Chittenden (1973, 1975) reports that over time, as teachers increase in experience and confidence, they move from concern with "fire-fighting" and day-to-day problems to more concern with "conceptual learning" and students' reactions to new practices (reported by Lickona and Hasch 1976).

A related point is that individuals exhibit different behavior as they progress in the acquisition of new roles. Stages of role-acquisition include an anticipatory stage, a formal stage, an informal stage and finally, a personal stage. Zaltman and Wallendorf (in press) point out that during role acquisition, performance becomes increasingly personalized, and individuals come to depend less on formal expectations and more on their own abilities and skills. Teachers in different stages in their acquisition of new roles can be expected to need different kinds of information and assistance.

Teacher competence is fueled by professional interaction and, conversely, may wither where this is not available.

An earlier section noted that the linkages available for the staff of a school organization have much to do with organizational innovativeness. Here, we add further that individuals with many outside associations are more likely to be confident, competent, and innovative (Havelock 1969).

Conversely, the isolation of teachers is cited as a major reason for the slowness of schools to innovate (Schmuck et al. 1975, House 1975).

For individuals trying to implement an innovation, there is support in numbers.

According to the Rand study, those programs that involve a number of people rather than scattered individuals have a greater chance of success; the supportive group seems to form a "critical mass" (Greenwood et al. 1975). Rogers (1976) and Drumm (1976) agree. Rogers writes that individual teachers may be discouraged, even "crushed" in a hostile school environment. Edelfelt and Lawrence (1975) discuss the negligible change that single teachers who attended NSF or NDEA institutes were able to effect in their own schools. Teachers trying to modernize their classrooms in North Dakota needed to stay in continuing contact with like-minded colleagues if they were to experience success (Turnbull et al. 1974).

High school teachers may be less amenable to change efforts than elementary teachers.

Some researchers report a difference between elementary and high school teachers (Mann 1976, Fullan & Pomfret 1975). High school teachers relate to their fields more than to an overall school mission; they cooperate less as a staff and are less dependent on their principals, and they use their topic specialization to strengthen their resistance to change (Mann 1976). Rogers (1976) reports that so far, the growing teacher center movement has attracted relatively few high school teachers, who appear less inclined to participate in such interaction-oriented approaches to continuing education.

CHAPTER 3

STRATEGIES FOR EFFECTING CHANGE

Proponents of educational innovation have used a variety of strategies to encourage curriculum change. Most fundamental has been centralized curriculum development, the systematic designing and producing of nationally-scoped innovative materials and programs for use in schools. Other approaches have usually built upon this strategy, having as a general goal the increased adoption and use of these innovative curricula.

During the earlier part of the curriculum reform movement, developers concentrated on strategies to provide information about the existence of innovative products. They assumed that informed school people, eager for new materials and programs, would adopt and implement such products. Few realized the effort and time it would take for teachers to gain an understanding of new curriculum content and child development and evaluation and to develop the ability to manage a plethora of materials. Sarason (1971) points out that implementation of new curricula requires not only learning new behaviors but unlearning old ones, and that there was initially little awareness of the psychological and sociological implications of change.

As it became increasingly apparent that information strategies were too limited to help educators adopt and use new materials, programs, and ideas, there emerged a variety of strategies intended to assist implementation. Additionally, questions have arisen regarding the effectiveness of centralized curriculum development itself as a means of facilitating change, and alternatives to the process as it now exists have been offered.

This chapter summarizes arguments about the efficacy of centralized development as a change strategy. It then describes various models or strategies for adoption/implementation assistance, including information dissemination strategies and several strategies which aim beyond providing information to include training and establishing linkages among change participants. A final section reviews a variety of attempts to establish sophisticated advisory, supportive, and consultive organizational arrangements. The individuals and institutions discussed are attempting to consolidate a bundle of the various strategies rather than relying upon one way to effect change. Underlying this approach is the belief that long term, sustained, easily accessible support for teachers, schools, and/or districts is essential for change in schools.

Curriculum Development

As a means of facilitating educational reform, government agencies have sponsored efforts to develop curriculum alternatives which use and are based on the results of research on teaching and learning. The rationale has been that well-developed classroom practices and materials can provide the vehicle for teachers and others to change their behavior and improve learning. Education is addressed as a technology-based enterprise which can be improved through improvements in technology. Indeed, much of the enthusiasm for curriculum development grew from a belief that valuable knowledge from educational research could be applied in the classrooms if only it could be translated into terms and materials usable by teachers (Levien 1971, Sikorski & Hutchins 1974, NIE Task Force Document 1973).

In general, curriculum development has had a disappointing history.

While curriculum development has had some success as a change strategy, most observers believe the outcomes have not justified the costs (see, for example, Nygren 1976, Mann 1976). Resultant developments have not been as widely used as was expected, and where they have been adopted, frequently their essential innovative qualities have been lost in the process of local adaptation (see, for example, Hutchins 1976).

The limited success of curriculum developments has been largely attributed to the developers' failure to consider mechanisms for dissemination, servicing, and implementation assistance necessary for schools to use their products.

This belief has led to many projects to study or assist dissemination and implementation (of which this report is one). Specific models for adoption/implementation assistance have been devised and are described in the next sections of this chapter.

But there is a second reason given for the limited success of curriculum development, and that is that resultant developments have features or attributes which make them difficult or undesirable to use, even where massive implementation assistance is available.

Thus, there are many studies showing how innovation attributes can explain the success or failure of development efforts. Rogers and Shoemaker (1971), reviewing the literature on innovation in a number of fields, conclude that the desirable attributes are communicability, compatibility, trialability, divisibility, and perceived advantage. For educational innovations, Kester (1976) emphasizes six categories, covering the user's perception of : (1) relevance of the innovation; (2) additional resources required; (3) consonance with user values; (4) effectiveness of the innovation; (5) credibility/respectability of the source of the innovation; and (6) radicalness of the innovation. Numerous investigators report

findings that show a negative relationship between attributes such as radicalness and disruptiveness of innovations and the implementation of those innovations in schools (Lindeman et al. 1969, Miller 1974, Turnbull et al. 1974, McCune 1974, Widmer 1975). In studies of educational products, factors found to be important include money, energy, and time requirements (Brickell 1971, Wolf 1973), completeness (Brickell 1971), maintenance of professional image (Bennis et al. 1969), and profit-making potential (Miles 1964). Rand researchers report that successful innovations are more central and consonant vis a vis district goals.*

This line of research is potentially useful for educating developers about possible problems with their products. They may use such information in design stages or in devising training or other assistance for users. As an example, the publisher of Developing Mathematical Processes made that program easier to implement by dividing materials into smaller modules (Moser conversation, October 1975). Developers at the Southwest Regional Laboratory provide specific assistance to ease the implementation of what might otherwise be "radical" products (Niedermeyer & Moncrief 1974).

However, the research on innovation attributes remains at a fairly general level, and its applicability is not always apparent. This calls into question the idea that developers can design a "nonradical" or a "relatively advantageous" product, or a "compatible" product. Attributes of successful innovations tend to be abstract properties which take on meaning only in terms of the needs and wants of a <u>particular</u> user group. Thus, a product is "radical" for some groups but not others; it is central to some needs but not others, and so forth. It is generally felt that curriculum development <u>can</u> result in useful products, if only developers can find ways during the development process of adequately representing

*This literature is more extensively reviewed by Hall & Alford (1976).

and subsequently responding to the wants and needs which influence users' perceptions of the innovation (Schaffarzick et al. 1976).

Ways (strategies) which have been proposed to allow more representation of users' wants and needs include: (1) encouraging local development of innovative materials and (2) conducting centralized development of materials but with more effective feedback mechanisms for representing user wants and needs.

It is felt by some that curriculum materials developed at the local level will be more responsive to user wants and needs.

The rationale is obvious: if users develop their own materials, they will be maximally responsive to their own wants and needs. Some schools have successfully developed their own innovative materials, and in one study, these have been found to be associated with successful change more often than imported materials (Berman & McLaughlin 1975). But the advantage seems to be in the process itself, more than in the relative quality of materials developed. Participation in development gives local staff a sense of involvement and an opportunity to learn required capabilities (McLaughlin 1976).

A problem with relying on local development is that teachers may lack the necessary knowledge and skills. This has prompted suggestions that resources for local development be redirected to support activities which would allow and facilitate colleageal interaction and professional growth for teachers. The success of such efforts for promoting change is discussed later in this chapter (p. 79), but it should be noted here that there has been no systematic investigation to demonstrate whether this results in continual successful local development for innovation.

A related problem with local development is that local-level practitioners may not want to carry out developmental activities, even if they can

acquire the appropriate skills. Our discussions with mathematics teachers at the 1975 California Teachers of Mathematics Conference led us to conclude that while they want to have a determining influence, they do not necessarily want the increased burden of preparing a total curriculum themselves.

Another objection to an approach which would rely on local development is that certain constituencies and issues may be shunted aside, since they take on importance mainly from a national perspective and may require amassing huge and widespread amounts of talent and resources (Hutchins 1976, Schaffarzick et al. 1976).

An alternative to local curriculum development is continued centralized development, but with improved mechanisms for feedback from potential users.

The obvious first such mechanism is to conduct field trials with actual users. In fact, this is usually done, but trials and samples used have been unrepresentative and unrealistic (Turnbull et al. 1974, Rosenau & Hood 1975). So a first consideration is to develop representative samples and useful situations for field trials.

A further suggestion is to establish some form of continuing needs-sensing or needs-assessing process--perhaps a "consumer panel" for education (Schaffarzick et al. 1976, Zaltman et al. 1977). This would provide information for developers which would reflect trends as well as current needs.

Some projects have attempted to involve representatives in the development process. This activity is intended to help build support for the project before it becomes commercially available as well as helping to insure that the materials are usable in the classroom. BSCS biology is a good example of a program that enjoyed widespread publicity before its commercial release, thanks in large part to enthusiastic word-of-mouth

promotion by teachers and professors who had participated in its development and field testing (Grobman 1969; see also Turnbull et al. 1974). Another curriculum, Individualized Science Instructional System (ISIS), is encouraging future use through twenty-two field-test centers scattered throughout the U. S. Unified Science and Mathematics for Elementary Schools (USMES) has attempted to encourage field-test teachers to critique materials, suggest topics and activities for new units (called "challenges"), or suggest additional activities for existing units.

Several projects such as Sociological Resources for Secondary Schools (SRSS) have used writing teams made up of subject matter experts and teachers. The Human Behavior Curriculum Project of the American Psychological Association has broadened this concept. Each writing team consists of two teachers, one or two psychologists, and two high school students. The use of teachers as curriculum writers/developers has two major weaknesses: (1) not all teachers--even good ones--have the requisite skills for writing, and (2) the teachers are often out of touch with the content. The Social Studies Development Center at Indiana University attempts to staff projects with persons with experience in the content area, e.g., political science, and persons with experience with the student population, e.g., junior high school. Both kinds of experiences are apparently helpful in producing quality work (Mehlinger conversation, March 1976).

Another suggestion for maximizing user input is to attack the problem of engineering curriculum developments so that significant user input is possible at the time of use (Bezuszka 1975). Some components of an innovation may be too difficult or expensive for users to develop themselves, and these would be provided through centralized development processes. But other components should be developed by users. The challenge is in learning this

configuration of components and in designing innovations which result in systematic rather than reactive adaptations by users of innovations.

The possibilities inherent in such an approach are becoming recognized. In a recent conversation, Gerald Zaltman noted that "susceptibility to adaptive modification" seems to be an important innovation attribute, and that the developers of a set of educational simulation games found that when they built in flexibility, providing users with guidelines for altering the product, the number of uses and users of the games increased. He pointed up the importance of getting users into the innovative process. Asked to offer an analogy from consumer marketing of a product with "susceptibility to adaptive modification," Professor Zaltman described how "do-it-yourself" products--such as bookshelves--provide the components which are difficult for consumers to develop but allow consumer-creativity in determining how the materials are put together and what exact function they serve. A "do-it-yourself" phenomenon in education would assume that innovative curricula should be adapted, but that certain components are most easily provided by central developers, and guidelines for adaptation can help users avoid pitfalls. Professor Zaltman was careful to point out that it is crucial to do a careful study of potential users, to learn which aspects they want to or need to control.

But change planners are quite far from knowing what elements are important to prescribe. Further, it is likely that different elements will be important under different circumstances. For example, Hall et al. (1975) present a strong case for the contention that users need explicit guidelines at earlier stages in their use of an innovation; at later stages, they may want to shape their own uses. In effect, such guidelines

may substitute for knowledge and skills until these can be acquired (see also Fullan & Pomfret 1975).

Another perspective argues against curriculum development on the grounds that our instructional technology is now relatively adequate, and we should focus instead on development of the user.

Certain investigators note the diminished need for more or better products than those which now exist or will emerge with or without federal support (Mann 1976, Popkewitz 1975). The problem is in helping schools to be able to use the technology we already have or that can be developed locally.

One kind of help is to provide the necessary funding and let users make their own plans for using it.

Certainly, outside funding or assistance for finding supplementary money is frequently necessary to relieve the burden of supporting innovation (Turnbull et al. 1974). Anderson and Horn (1972) report that no district they studied implemented Elementary Science Study (ESS), Science--A Process Approach (SAPA), or Science Curriculum Improvement Study (SCIS) throughout the district within three years unless it used outside funds. In Massachusetts, 75 percent of the elementary systems surveyed had used federal funds to support science curriculum innovation (Whitla & Pinck 1973).

There are problems associated with providing funds from outside. Of immediate concern, of course, is the question of the extent to which the funding source should have discretion over how funds are to be spent (Rogers 1976). Popkewitz (1975) presents case study evidence of how concern with the funding source's priorities can destroy a program at the local level. However, this problem should be resolvable, and in fact, it has been found to be relatively unimportant in federally funded change-agent programs (Berman & McLaughlin 1975).

But the influence may be subtler than a direct discretionary one. Mann (1976) points to how a funding source may affect goal setting; initial goals may be extremely ambitious, then later goals may narrow, to allow for easier demonstration of success.

Another problem is the motivation of school systems when outside funding is sought. Sikorski (1975) suggests that in some cases schools may propose changes in order to obtain funds rather than requesting funds in order to facilitate change. Berman and McLaughlin (1975) have documented this as a problem: where the motivation for requesting funds is "opportunistic" (i.e., to take advantage of available money) rather than problem-solving in nature, meaningful change is less likely. The implication is that systematically providing "seed-money" should be a careful undertaking which probes into the motivation for change as well as the substance of change.

In the next sections, we turn to other strategies, dissemination and implementation assistance strategies, which are aimed at promoting and assisting increased use of existing knowledge and technology for improving learning.

Information Dissemination

Change strategies have evolved around the adoption and use of existing materials, and one broad class of strategies includes those aimed at disseminating information about innovative curricula or relevant to the use of innovative curricula.

The role of information strategies for increasing curriculum uses is limited, but it is important.

External contact and information fuel change, and information quality can determine whether change will be efficient and effective.

At the earliest awareness stage, receivers learn about new developments mostly from their colleagues in their local situation (Zaltman et al. 1977, Berman & McLaughlin 1975, Sikorski & Osborne 1973). If they can attend conferences or some other medium for colleageal interaction, they acquire a good deal of new information and fresh motivation, but only a few teachers have frequent access to such non-local colleageal interactions (Zaltman et al. 1977, Hansen 1[illegible] House 1975). Because this kind of interaction is so promising, Berman and McLaughlin (1975) have proposed providing grants to allow teachers and administrators to spend time in other districts, gaining first-hand experience with innovative programs. This approach has been used in the training for implementation of Individually Guided Education (Turnbull et al. 1974).

In general, print materials are not widely used to learn about new developments (Rosenau 1974, Newfield 1975). If decision makers do seek out print or other impersonal information, they want to go to curriculum-specific sources (Newfield 1975).

Once users are at later decision stages, they want hands-on experience with innovations and interpersonal interactions with trainers or other users (Zaltman et al. 1977, Rosenau 1974).

An important condition for effectiveness of an information strategy is appropriate targeting. For example, a demonstration program that successfully makes teachers aware of and enthusiastic about a new product may ultimately be unsuccessful if it is not the teachers who make the decision to purchase that product (Hutchins & Dunning 1973).

On a more general level, some relatively recent work on network analysis is relevant here. It appears that the key persons to whom information should be directed to achieve the most rapid diffusion are those who maintain "weak ties" (Liu & Duff 1972, Rogers 1976). Weak ties are social relationships which only loosely bind together the people involved. People connected by a weak tie are likely to maintain relationships with a wide diversity of people and are thus apt to relay information to different sets of people; for this reason they are particularly important communicators. Moreover, there is a tendency for people who maintain any weak ties to accumulate many roles characterized by weak ties. Thus, high role accumulators are important communication targets in educational settings.

Information sources or systems are valued for the characteristics of "relevance," "speed," "currency," "authenticity," and "comprehensiveness," in that order (Hood 1974), but in general, users refer to sources which are readily available, succinct, and non-technical (summarized by Green & Raizen 1976).

Channels for the dissemination of educational information include information systems and products, field agents, project newsletters and conferences, presentations at professional conferences, information workshops for decision makers, demonstration sites, and the textbook review and adoption process.

Information systems include national, regional, and state systems, and systems sponsored by professional educational associations.

Generally, the intent of such systems is to provide "objective" information, not promoting any particular product or point of view. The most prominent educational information system is of course the Educational Resources Information Center (ERIC), a massive operation which gathers, catalogs, and makes available an enormous quantity of research information. Because of the difficulty in locating ERIC information specifically related to a curriculum, this source is not commonly used in the search for new curricula. In fact, ERIC is used mostly by educational researchers and students (Hood 1974).

Certain information products are intended to provide information in a more manageable format, targeted to the needs of specific groups of practitioners.

An example is the Far West Laboratory's Elementary Science Information Unit (Hutchins et al. 1970). Such units contain summary comparisons and indepth descriptions of a number of curriculum alternatives. The Social Science Education Consortium Databook provides information on a large number of social science project materials, textbooks, and simulation games. Its looseleaf notebook format allows continuous updating. A similar publication, edited by J. David Lockard at the Science Teaching Center at the University of Maryland, provides international coverage of Science and Mathematics curricula projects.

Such information products are used and appreciated by curriculum decision makers, but they are usually not sufficient for adoption decisions. They lack the hands-on experience with curricula which decision makers feel they need (Sikorski & Osborne 1973, Hutchins 1970).

Field agents provide indepth information with a "personal touch."

There is evidence that personal communication may be more important than written materials in bringing about educational change (Wolf 1973). One approach has been to combine the two, so that users access information systems and products through a "warm terminal" or educational field agent. This idea is an adaptation of the so-called "agricultural extension model" (Rogers et al. 1976). The field agent works with users to determine their information needs and direct them to appropriate resources. A pilot test of an educational extension agent program was described by Sieber (1972) as a "highly successful tryout" that "needs improvement." One-third of the clients found the information they obtained from agents "very useful," and almost twice as many felt that personal assistance had been useful. The Sieber analysis suggests that clients may have endorsed the service because it was free and they did not wish to see it curtailed. The evaluators also felt that field agents should be located in intermediate agencies (regular resource centers, intermediate education districts, county offices, or large district offices), with local consultants being available to help the agents. Important role aspects seemed to be: status as an outsider, a repertoire of change-agent skills, ability to follow up, and monitoring by a federal agency. The person filling the role should ideally

- be non-authoritarian,
- patient,
- tolerant of delay,
- have a low need for ego-aggrandizement,

- like meeting people,
- think and speak clearly,
- not act as a missionary for a particular practice,
- be adaptable, and
- be orderly.

The study also recommends a team of agents--one with administrative background and one with teaching background--plus support services (reviewed by Rosenau 1974).

Another well-established nonprofit field-agent role has been that of staff members of intermediate and state agencies, operating with state and/or federal funding and supplying materials at or below cost. Title III centers, Research Information Services for Education (RISE), Boards of Cooperative Educational Services (BOCES), county offices, etc., provide well-known examples of this tactic. (A one-year "state facilitator" experiment was launched in July, 1974, under the auspices of USOE, funded by ESEA Title III.) State agency staff, if not perceived as threatening by local personnel, can also reduce resistance to change through technical assistance efforts (Rosenau 1974).

A related kind of program in the social science area has been described as successful. The Social Studies Field Agent Training Program developed at Indiana University tested the feasibility of training social studies teachers (Social Studies Field Agents) to return to their local districts to disseminate information about new materials. Among the many findings, the most important seem to be:

- The field agent should perhaps represent a power position.
- The district should make a commitment to support the program.
- Field agents need inservice programs and evaluation packages.

Even in this short-lived project, the problem of trainee turnover came up. Though certainly not limited to this project, the turnover problem experienced by it will also confront any future program which relies upon training teachers. This project's suggestion that the field agent be drawn from a power position was in response to this problem as well as to the problem of powerlessness on the agent's part in the districts (Marker & Mehlinger 1972).

Closely allied to the extension agents, though recruited differently and left mainly to their own devices at the conclusion of preliminary training, are teacher associates (e.g., Social Science Education Consortium). According to SSEC, the quality and effectiveness of teacher associates has been "high," with a substantial and demonstrable impact on their school districts and, in many cases, on broader constituencies (Rosenau 1974).

Several of the curriculum development projects have used periodic newsletters to develop interest in the project's materials among users and to keep them informed about the progress of development.

For example, the Human Behavior Curriculum Project newsletter announces their anticipated timeline for reviewing module development proposals from the writing teams as well as the progress of those teams which have already been funded. The USMES newsletter also serves as an exchange for ideas on the use, adaptation, and extension of USMES materials and ideas by users. The concept of a publication to support the idea of "real-world problem-solving" is currently being expanded into a journal by USMES which, while not replacing the newsletter, will allow more substantive discussion of ideas and issues involved in this approach to education.

Conventions, conferences, and national meetings of any number of educational groups provide an available forum for the presentation of information about recent developments.

Commercial publishers have made extensive use of this strategy. An editor at a large publishing company writes, "We make great use of conventions, especially National Science Teachers Association (NSTA), to introduce products and authors--at least in science. It's also the time when we hope to influence potential users by entertaining them." However, the materials, displays, and entertainment are not the only contacts made with developers (commercial or publicly funded). Presentations regarding new materials, especially pilot and field-test results, are often made by project personnel, users like district supervisors, or independent third parties such as university researchers (graduate students and professors).

Some of the curriculum development projects have sponsored two- to three-day conferences at the state or regional level to explain the project to significant persons in that area: decision makers in the schools, state department personnel, and teacher trainers.

These conferences are used to lay the groundwork for the ideas embodied in the project's materials. For example, during 1975-76, the Comparing Political Experiences (CPE) Diffusion Project has sponsored six regional conferences. These conferences have attracted a mix of people--political scientists, social science educators, supervisors and coordinators, and department chairpersons. The CPE staff have presented the intellectual rationale for the project, given some demonstration lessons, and explained their initial implementation plans. The goal is to build support for the project and to develop a compatibility of interests among the participants so they may serve as resources to each other during adoption and implementation. (Gillespie, conversation Marcn 1976.)

The workshop or conference has also been used to introduce a variety of project materials to decision makers.

Emily Girault and Richard Gross have conducted two-week workshops for administrators at Stanford University during the last three summers. At these workshops, fifteen to twenty relatively new social science projects' materials were introduced, generally by the developers, to the participants. Initial whole group presentations were followed by an opportunity for participants to examine each program more closely.

Demonstration sites provide valuable indepth information about operating projects.

Hutchins and Dunning (1973), reporting on demonstration sites, conclude that such sites are valuable in creating product awareness, provided that the staff of the site have the willingness and capacity to serve as an active information resource. But Lapan (1971) cautions that only a small portion (about two percent) of visitors to a demonstration site fully adopted the program. The establishment of "lighthouse schools" without active dissemination components seems to result in even less diffusion (Ford Foundation 1972). In any case, the crucial element appears to be not technically elaborate displays but the small-group, personal contact with someone who can explain the way an innovation works in practice (Sarbaugh 1973, Rosenau 1974).

Rosenau (1974) reports that demonstration sites are too expensive to justify their use for simple awareness information, but for providing indepth information about high risk, complex innovations, they are invaluable, and they serve to reduce unanticipated consequences of a particular innovation.

As an ancillary use, demonstration schools can also provide a development staff with a more complete picture of the implementation process that their project requires. USMES is attempting to ascertain the administrative effects of the widespread use of USMES in two model program schools. They are investigating these schools to see staff time allocations and USMES effects on the total school program.

Subjecting materials to the participatory reviews for state textbook adoption can be a means for informing potential users about them.

John Harrold, State Social Studies Coordinator in Indiana, used the 1974 state adoption as an opportunity to increase the use of project materials. Committees of readers were organized; a series of twelve regional conferences to assist schools in evaluation techniques was held, and a materials evaluation form was published. Further, Harrold developed a system of textbook categories that permitted the selection of materials from a broad range of ability levels, content, and methodologies (Risinger, n.d.). As a result of this process, many school districts chose materials associated with the "new social studies." In American history, ninety districts selected the traditional, chronologically-formatted Rise of the American Nation, while seventy-seven selected texts which used the "source documents" approach, curricula which clearly reflected the influence of the "new social studies" projects. Similar results are found in the elective courses. However, the inroad established in the American history market is remarkable considering that this area often represents 50 percent of the school social science textbook expenditures (Risinger, n.d.).

State adoption lists are, by themselves, a useful information source. In California, the Buyers' Guide, containing descriptions of projects accepted for state adoption, is available free to all districts. Because there are so many products from which to choose, such information can be instrumental in helping districts become more informed and open to new products. Curriculum Development Associates used reprints of the state produced Guide to advertise their mathematics program.

When materials are not listed, diffusion may be hampered. Hahn (1976) found that some materials widely known and used in Indiana and Ohio were almost unknown in Georgia and Florida. These materials were not on the adoption list in these states. (Incidentally, these materials were from Harvard's Public Issues Series--considered by some as too controversial--but they were widely used in Ohio and Indiana, which are conservative states).

A variety of other means may be used to create awareness of an innovative product.

These include direct mail, conference presentations, journal articles, advertising, and national TV. Rosenau (1974) furnishes useful suggestions for carrying out some of these tactics but warns that they will not be sufficient to produce implementation, a warning also voiced by other researchers (Turnbull et al. 1974). Awareness tactics generally do not provide the hands-on experience or proximity that decision makers feel they need to have before a curriculum decision can be made. Further, even for mediating simple awareness, they are not always effective; repeated exposures and good targeting are essential (Rosenau 1974, Rosenau & Hood 1975). Awareness campaigns often overlook the necessity for providing response channels. This not only may render the campaign ineffective, it may actually result in user frustration and subsequent bad feeling

about the innovation in question, what Kotler and Zaltman (1971) have called "interest overkill." Even where the campaign provides an adequate response channel, usually more is needed, some kind of follow up which does not depend on the initiative of the receiver.

Implementation Strategies

In attempting to extend the effects of curriculum development, developers, university educators, and school people have emphasized training and/or the development of linkages among users. These strategies represent a substantial departure from the notion that development and information dissemination will effect the desired change. They have evolved as educators have attempted to "work out" a process (or some processes) of implementation. Much of what has been done in these experiences is consistent with the research findings presented in Chapter 2. For example, some strategies build leadership for change by training key persons (teachers, administrators, and educators) in the innovation and in the process of change. Many seek to develop comm'tment of decision makers to the curricular philosophy. The Resource Personnel Workshops demonstrate the value of working with teams from a locality and stress that these teams include individuals from a variety of roles in the educational system. The involvement of users in development (e.g., SRSS and The Human Behavior Project) and the extensive use of field testing and revisions based upon teachers' comments (e.g., USMES) have helped build support for the projects among users as well as helped assure that the eventual product will be acceptable to users. Projects have recruited teachers and administrators who agree with the project's philosophy and/or have, through analysis and discussion of the educational philosophy

of the project, helped individuals come to their own personal decision regarding participation.

While they may be consistent with basic research, these strategies were largely developed on the "front lines" of implementation, where there was not always time or resources to consider the problem of implementation in a holistic fashion. Here we collapse the variety that exists into a few categories and discuss how they operate.

Implementation strategies stress that training of teachers must accompany the use of innovative materials.

Training takes many forms and is used in conjunction with diverse strategy-elements, so it is difficult to find studies which show an unambiguously direct relationship between training and curriculum reform. (The next chapter outlines the many problems of evaluating this and other change strategies.) But the need for training to accompany innovation is very widely recognized with regard to innovations in general (Ford Foundation 1972, Turnbull et al. 1974, Sikorski 1975, Greenwood et al. 1975, Hall 1973, Fullan & Pomfret 1975) and with regard to new curricula in science (Anderson & Horn 1972, Piburn 1972, Whitla & Pinck 1973), mathematics (Callahan & Glennon 1975, Devaney & Thorn 1974), and social science (Winn 1971).

In our conversations with science, social science, and mathematics educators, we repeatedly heard this need stressed. As one put it, "We can't drop new materials in teachers' laps--a tremendous amount of inservice is needed."

However, training accompanying innovative materials is usually keyed to those materials or to a particular curriculum. The problem with many inservice programs specific to particular curricula is that they have been of short duration and have offered little continuing support to teachers:

> . . . Efforts have often been confined to minimal training in how to use the project materials and methods. It is doubtful that two-week or even two-month workshops will have any significant impact on the fundamental preparation needed by teachers to assure improvement in mathematical instruction (NACOME 1975).

Additionally, curriculum-specific training has the disadvantage that its efficacy rests more on the quality and use of the curriculum than on the increased professional development of teachers. Such training can preclude or discourage the use of other, perhaps more suitable, curricula. A related problem may be the lack of a prior district commitment to use the curriculum in which teachers are being trained, as in the University of South Dakota's summer workshops (Willson et al. 1974).

Many educators believe that at least part of the training available to teachers should go beyond use of specific materials and into broader skills.

In virtually all of our conversations with science, mathematics, and social science educators, this point came out. As one put it, "You really only change school programs in the singular. A school may adopt, develop, or modify its own curriculum. It's the people on the lot who make changes."

Respondents suggested available training should include: "training for rearranging/modification for local needs," "staff development focusing on how to build a 7-12 or K-12 program," "a model on how to take a good project and implement it well," "tremendous inservice or 'grass roots' development so teachers can make their own," and "inservice staff development which does not focus on one curriculum . . . focus on process and concepts rather than materials."

But it is not clear what form a broader, more "curriculum-free" kind of training can take to eventually promote change in schools. Early programs (NDEA summer institutes) for updating or expanding the teachers' knowledge base in a broad subject area (e.g., history, math, French, or political science) have been reported as having produced minimal carry-over into the classroom (Perloff 1970). More recent research is consistent in showing that tying training to specific materials does lead to more application in the classroom. Some say that the most successful training is closely tied to the innovation being implemented and takes the form of concrete, "how-to" sessions (Bracht et al. 1973, Willson et al. 1974, Greenwood et al. 1975). Further, teachers are reported to value highly practical help and concrete guidelines for use in the classroom (Chittenden et al. 1973, Warren 1975, Lickona & Hasch 1976). In evaluating training tied to two or more projects, Kissock and Wangen (1975) found much application of the training--70 percent of the participants still use the materials and strategies (the remaining 30 percent have been promoted or are now in graduate school). NSF-sponsored summer institutes for science teachers have both increased participants' skills and promoted the use of the new science curricula used there (Gibney 1971, Howe 1974).

Still, this demonstrated value of curriculum-specific training is in its immediate and not necessarily its long-term effects. There is broad general consensus that curriculum change depends on training, and that while it may be easier to use training keyed to the use of a particular curriculum, for long-term improvement, the training must go further (Ornstein 1976, McLaughlin 1976, Taylor 1975, Tempkin & Brown 1974). A dependence on materials must be replaced with sustained training and support of teachers as a way to solve educational problems (Lapp 1975, Callahan &

Glennon 1975, Reyes 1972). This is reinforced by the finding that while virtually all teachers value practical help, the least confident teachers are most likely to want to get ideas to apply in class, and only confident teachers want "conceptual learning" (Chittenden et al. 1973). The implication is that specific, concrete guidelines play a temporary, "fire fighting" role for developing teachers, but these will not suffice for the experienced professional. And since it seems to be true that more confident teachers are the ones who are eager to innovate and least threatened by and resistant to change (see p. 46), they comprise an important target group for change advocates. The problem is to find forms for conceptual or "curriculum-free" training which are as effective as those which are curriculum-specific.

A step closer to curriculum-free strategies has been taken by Girault and Gross in their 1973, 1974, and 1975 workshops. In these information dissemination activities, they brought together teams of decision makers from districts and introduced fifteen to twenty different programs in a two-week period. Project and/or publisher representatives gave presentations and the programs were examined in small groups. We have not yet seen definitive evaluations, but attendees were enthusiastic about the benefits of the experience. Various curriculum projects, for example, the Madison Project and the Arithmetic Projects, have emphasized educating teachers, rather than developing materials for students. Inservice projects like the Specialized Teacher Project (Dilworth & Warren 1973) and a similar project in Washington state grew out of this belief in the importance of inservice education beyond training in the use of specific materials. A representative from Addison-Wesley attributes California teacher attraction to their student mathematics program in part to the training teachers received

in the use of manipulatives through the Specialized Teacher Project. That is, teachers with more general competence in the use of manipulatives were more interested in an innovative program which gave them an opportunity to use this competence. A representative of Curriculum Development Associates emphasized the importance of competent (well-trained) teachers to the successful implementation of their program. "CDA conducts long indepth inservice training. Things are slower that way, but we prefer it."

Preservice education provides a broad training experience, but it is felt to have limited effectiveness for curriculum change.

One reason is that although new teachers may be enthusiastic about using innovative curricula they learned about in college or graduate school, they have very little influence by themselves (Zaltman et al. 1977).

L. C. Taylor (1975) writes, "So radical and swift has been recent change in education that the traditional pattern of training has become obsolete. About twenty-five years must pass before a teaching force will consist of a majority of teachers who, as students, have learnt the new ways. Meanwhile, those new ways, in their turn, will have become old and outmoded."

And the ratio of new to old teachers is steadily decreasing, diminishing their impact even further (Mann 1976).

Thus, curriculum change generally depends on inservice training for practicing teachers.

As Ornstein (1976) notes, ". . . continuing education of teachers is part of the price that must be paid for quality education."

Fullan and Pomfret (1975), summarizing the available research evidence on inservice training for innovation, point out why it seems to be effective but call for more careful investigation of how it can be most

effectively conducted:

> . . . It appears that intensive inservice training (as distinct from single workshops) is an important strategy for implementation. Apparently, this experience functions to provide teachers with demonstration models and experiences as well as psychological reinforcement conducive to resocialization. This is only speculation because there has been no systematic attempt to specify and compare different types of inservice experiences. Furthermore, there are still many other unanswered questions about the nature of inservice training concerning the amount of structure or direction, the best types of trainers, frequency and timing, and so on.

It has been suggested that inservice training may come too late in most teachers' careers.

Ornstein (1976) writes that "teachers develop competence and become aware of their roles as teachers during the first two or three years of teaching . . ." Thus, timing may be the reason that preservice training is comparatively ineffective and much inservice training is also ineffective. (See also Spillane and Levenson, 1976, who write that preservice training is inadequate because teachers are not at that time trained in the competencies needed to function in the classroom.) He calls for continuing education to start early and involve "serious retooling and learning," perhaps including paid sabbaticals for teachers.

A strategy of teachers-training-teachers builds on the assumption that teachers learn best from their colleagues.

Research does show that training done by "insiders" can be more effective than training by an outside consultant (Anderson & Horn 1972, Greenwood et al. 1975, Edelfelt 1975, Wirt 1976). But this depends on two conditions: (1) that insiders have the necessary skills and (2) that

the trainees are not in a competitive or threatened stance vis a vis the inside trainer. Thus, research shows cases where insiders may not have the necessary expertise or objectivity to train others (Whitla & Pinck 1973, Turnbull et al. 1974, Greenwood et al. 1975, Baldridge et al. 1975). Mann (1976) reports that teachers often prefer to go a long distance for help or training, to avoid the implication that they are inferior to immediate or proximate colleagues, and Willson et al. (1974) mention problems in the peer relationships between teachers and the teachers they instruct in a formal setting. An evaluation of another such program suggests a more general difficulty with selecting local resource personnel. In the Collaborative Elementary Science Project of the University of South Dakota, teachers did obtain much implementation help from their local colleagues--but not necessarily from the ones who had been specially selected for leadership workshops. More important than these workshops seemed to be previous experience with the curriculum being implemented, as evidenced by the way teachers turned to any teacher with such experience whether or not he or she had been designated as a "leader."

An example of a teachers-train-teachers approach is the diffusion of Research Utilizing Problem Solving (RUPS), where trainees become trainers. Another example is SCIS. Developers invite science educators to visit project headquarters for a week or two and learn about the curriculum. Upon returning to the district they are expected to help others in program implementation. Further applications to science curricula are described by Anderson and Horn (1972) and by Piburn (1972), who notes the need for assistance from salespeople and training institutions. The

lack of such assistance hampered the operation of this approach in disseminating the Toy Library (Turnbull et al. 1974).

The concept of developing internal resource personnel to assist the implementation of curricular programs led to the Resource Personnel Workshops funded by the National Science Foundation. The RPW's main objective was to train a cadre of teachers, administrators, and university personnel in the rationale, philosophy, pedagogy, and materials of a select number of projects. Content dealt with instructional strategies and the process of change as well as the curricular materials. Girault and Gross (1973) have found that the teams are able to carry out much of their plans when they return to their local sites. A result of "collaboration among neighboring teams has been the gradual emergence of leadership networks of social studies resource personnel in four states" (Girault & Gross 1973). Also, the teams have continued to function independent of the workshop leaders. Four developed proposals for funding to support continuation and expansion of their activities. Kissock and Wangen (1975) found that teachers trained at their 1973 Resource Personnel Workshop were still using project materials two years later. Further, the RPW participants were training other teachers who had not participated in the workshop. Thus, the RPW is "very effective in achieving direct implementation and broad dissemination of the project materials" (Kissock & Wangen 1975).

Other findings relevant to training as a strategy stress the importance of teachers' voluntary and active involvement and the use of appropriate incentives.

Mann (1976) reports that training works better with volunteers but cautions that attention to this group risks the danger of allocating

resources where they are least needed. Edelfelt and Johnson (1975), Yeatts (1976), and many others emphasize the positive effects of teachers' active involvement in planning inservice programs (see Rogers [ed.] 1976). It is generally felt that voluntary, active involvement leads to a strong personal commitment and that this is necessary for a successful inservice program.

Consistent with the general belief that teachers are motivated by personal commitment to the program is the finding that material incentives are <u>not</u> most important for teacher participation.

> Intangible professional or psychological incentives were more effective in soliciting teacher cooperation and involvement than were more tangible incentives such as extra pay, credit on the district salary scale, and the like (Greenwood et al. 1975).

Mann (1976) reports that the visibility of inservice projects made them more attractive to teachers. An important incentive is changes in career prospects. Some dissemination efforts have relied on professional prestige as an incentive for participation in new curricula, and results have been good (Turnbull et al. 1974).

<u>Professional networks can enhance and provide a medium for training efforts</u>.

It has been noted that the isolation of teachers is an important barrier to innovation (Stiles & Robinson 1973, Baldridge 1974, House 1975). Linkage strategies are intended to break down isolation and promote colleageal interaction and contact with outside resource systems.

Girault and Gross (1973) found state networks emerging from the activities of the teams that attended their Resource Personnel Workshops. Through summer training programs and participation in professional conferences, school personnel can meet and exchange new ideas. Held away

from the local school district, removed from many pressures and threats, such institutes help participants to be more open and able to take greater risks in exploring new ideas.

Some dissemination systems may use the tactic of activating established linkages or setting up new ones to put the potential user in touch with innovation (Havelock 1971, Zaltman et al. 1977). They put less emphasis on formal training than on increased awareness, motivation, and capability generated by the establishment of linkages among schools and between schools and resource systems (such as state and federal sponsors of curriculum development, dissemination specialists at the state or regional level, product developers, distributors, and training institutions) (Hall et al. 1973). Various forms of this model are employed by IGE, Research for Better Schools, Inc., the BSCS Human Sciences Program, and the Title III diffusion network.

Teachers' centers approach the problem of teacher retraining as having an essential interactive component. "Teachers exchange ideas, receive assistance, and learn from one another" (Ornstein 1976). A few commercial companies have instituted teachers' centers to help inform teachers about use of their materials and to assist in implementation (Devaney & Thorn 1975). The 1975 annual report of the Kalamazoo Intermediate District Center reports survey results showing that 24 respondents (16 percent) adopted new curricula as a result of Center participation. Follow Through sponsors from EDC have helped develop centers as part of their implementation assistance to districts.

Many researchers feel that it is the organization rather than the individual teacher who should be the target of training.

"Organizational development" efforts aim at improving interpersonal relationships, communication networks, and planning skills in organizations. The emphasis is on setting up conditions favoring the change process in general rather than any particular change. Organizational development is an umbrella term describing strategies aimed at creating in schools and districts conditions supportive of change. It is based on research findings that indicate that educational reforms frequently fail because an organizational structure is not compatible with or supportive of innovative procedures (Schmuck et al. 1975, Zaltman et al. 1977, Popkewitz 1975, Parkay 1976). Thus it is argued that significant instructional change cannot be achieved without a supportive, effective organizational structure within which the change can operate.

A comprehensive effort to apply and evalute organizational development for schools is taking place at the Center for the Advanced Study of Educational Administration (CASEA) at the University of Oregon (Schmuck & Miles 1971, Schmuck et al. 1972, and Schmuck et al. 1975). CASEA staff have conducted consultation for organizational development in schools implementing the multiunit school model of differentiated staffing, and they have argued that, for major changes, teacher education that focuses on instructional activities is insufficient. Teachers need further sorts of training to learn how to work with others in the school organization for team teaching and group problem solving.

Organizational development consultants report success in that "trained" schools more successfully adopt such innovative practices as individualized instruction and team teaching. They do not show an increase in the effective implementation of packaged materials.

An example of some success is described by Hummell and Fisher (1976), who recently studied a ten-year-old project to change the organization, climate, and educational programs of a number of schools. These schools are now found to have continued certain innovative programs in an environment where systematic and collaborative planning and evaluation are maintained and staff confidence and professional growth are improved.

Various organizational development efforts report that changing organizational structure is facilitated by district support and leadership sharing by principals (Schmuck et al. 1975). Staff consensus, openness, and willingness to participate are important variables (McCluskey 1976). Schmuck et al. (1975) add further that willingness for hard work is a positive factor.

The contention that outside help for organizational development will be necessary for most schools (expressed by Schmuck et al. 1975) needs some elaboration. Some researchers (McLaughlin 1976, Popkewitz 1975) report that outsiders are not effective for promoting changes, perhaps because they are resented as intruders and because they are too far removed from the local situation. Hummell and Fisher (1976) find that one failure of the Organizational Development Project was that linkages to outside experts and resources were established but not sustained.

The failure to maintain such linkages is important because effective, self-renewing school organizations will probably continue to need help from outside. Thus, the question is not whether external change agents should be used but how they should operate. It is necessary that their relationship with "insiders" be collaborative, so that outsiders are not seen as intruding (Zaltman et al. 1977) and that they work closely with teachers in concrete applications (McLaughlin 1976).

Another implication is that individual schools' or districts' efforts at organizational development will probably be hampered so long as they are a minority. If organizational development efforts become more widespread, moves to improve linkage systems among schools will be likely.

Institutional Arrangements to Support Change

We have encountered many institutions set up to use a combination of strategies in order to promote change in schools. Their emergence indicates the belief that a single method will not lead to sustained change. In this view, single strategies like summer workshops might produce some change, but the likelihood of their being followed by long-term implementation is slim.

Conclusions offered in this section come from examination of several such organizations. The Federation for Unified Science Education (FUSE) center operates nationwide to disseminate information and technical expertise in unified science, encouraging adaptation of existing curricula to meet local needs. An example of a statewide organization serving a similar function in mathematics is the Oregon System for Mathematics Education (OSME). Two examples of organizations serving several districts are included: the Twin Cities Area Social Studies Service Center, and the Science and Mathematics Curriculum Exploration Center in Indiana. An example of a single school district program of this sort is the resident professor program. For an example at the local level, we have included further discussion of teachers' centers.

Examination of tactics used by these organizations echo research findings discussed earlier in this report.

Representatives of the agencies would agree, for example, that user

commitment and capability are necessary. The agencies all depend on meaningful user participation in deciding to innovate. Neither would leaders dispute that the characteristics of individuals in formal or informal leadership roles influence the innovativeness of school organizations. In these and many other ways, they validate various research findings.

When one views these organizations and their approach, it is possible to dissect their activities, breaking out individual approaches to innovation; but when one fragments the activities there is a danger of losing sight of the whole.

Tactics are interwoven, organic, changing. The interweavings in part grow out of a common understanding and acknowledgement that most innovations are far more complex than originally assumed, that simple tactics will not work with complex programs in divergent communities. Although the staff may work with interested school people in a curriculum-free program--a program that emphasizes organizational development, problem solving, or purely methods courses--this approach is infrequent. Neither do they urge school people to adopt one particular program; that is, their presentations are not usually curriculum-specific. The most frequent method involves suggesting a variety of alternative approaches or programs and offering training and in class assistance in planning for and implementing curricula. Assistance may concentrate on a specific curriculum, on blending a number of curricula, or on development of a purely local program.

There is a shared understanding of change as a slow process requiring sustained support.

This comes from acknowledgement of the complexity of the change process. FUSE states the shared belief: "active consultation and long-range cooperation with school groups . . . is a major activity of the center." (Thompson 1975)

The leaders stress that philosophical consonance between developers and implementers is of extreme importance. The change process is frequently seen as beginning with development of a philosophy, not with examination of specific curricula. Many of the leaders of such organizations would point out that the array of curricula, programs, approaches, and materials is overwhelming; the only rational place to start is assisting teachers in the development of their own philosophy about how children learn, and with that foundation, helping teachers select, adapt, and develop programs that fit with the teacher's own style of teaching and perceptions of how children in their own classes learn. Mathematics advisors for Multomah County, Oregon, observe:

> . . . Instead of looking for a panacea in materials, people should be looking at the philosophy behind the materials and at why kids learn. The successes we've had in our program can be attributed in large part to discussions and teachers' sharing of classroom experiences about their use of particular materials or activities. (Conversation January 1976)

David Cox of the Portland Project says:

> Any group of teachers who don't know what they want for kids will have problems in implementing a FUSE program. The group has to be committed to goals or objectives. . . . Those who implement only the structure miss the point and will fail. (Conversation March 1976)

Although the major goal is to provide long-term support, awareness functions and "fire fighting"--helping school people solve immediate problems--sometimes take precedence, especially during early development of the organization. By helping people during emergencies or introducing them to new products, such a program gives school people a chance to test the capabilities and expertise of project staff. Such interaction can lead to trust and to requests for assistance in long-range planning and implementation.

Activities that such an organization may undertake thus range from mediating awareness to assisting with long-term planning and implementation; the variations and combinations of strategies are numerous.

School people may be helped to become informed about new curriculum developments through a curriculum library; teachers and administrators may come to look at materials, discuss them with staff, and borrow them for use in their classrooms. Staff may offer single workshops centered around activities drawn from one or more curricula. Beyond awareness, staff may offer indepth training in implementation or adaptation of curricula, or on development of materials directly suited to the local situation, during the summer, during teachers' release time, or on Saturday mornings. Frequently staff are available, at teachers' requests, to come into classrooms to assist with implementation. Such courses and assistance are generally part of a district's, and the organization's, long-range plan for change within the schools. The variations and combinations of implementation strategies are numerous: newsletters, awareness workshops, curriculum libraries, regional conferences, representation at national conferences, consulting services and tailored long-term programs, internships at the organization, networking, leadership development support, field agents or circuit riders, in class assistance or advisory work, fostering of cooperation among elementary and secondary and secondary and college teachers, and curriculum adaptation and development support.

All the organizations employ strategies that are intended to be flexible, adaptive to local problems.

This stance has meant that the organizations do not attempt to implement any one curriculum, but staff try to be very well versed in many programs that might suit educators' expressed needs and philosophies. Implementation assistance might involve implementation of one program,

or adaptations of many, combination with local writing and developments, and totally locally-developed programs. A FUSE staff member writes:

> A further basic point of agreement within FUSE has been that no one set of instructional materials or approach to curriculum development is best for all school situations. Thus FUSE has acknowledged the uniqueness of each school's population, instructional facilities, and teaching staff. (Showalter 1973)

David Cox of the Portland Project notes:

> Diversity has undoubtedly been one of the reasons for (the Portland Project's) widespread success and acceptance. It has proven to be flexible enough to meet the needs of individual schools and at the same time be acceptable to local constraints. (Cox 1975)

The process of developing programs to meet and blend with local needs requires long-term support. A staff member from OSME writes:

> Many hours were spent and miles were covered by the director and mathematics specialist literally "beating the bushes" to seek out individuals and districts in sparsely settled parts of the state who might have an idea for a solution that would meet a need. (Nesseth 1975)

Staff, frequently former secondary or elementary teachers, have expertise in one or more curriculum areas and are knowledgeable about recent curriculum developments produced by the private and public sectors.

The organizations emphasize long-term assistance from leaders who are knowledgeable about schools, curricula, and subject matter, and are able to offer a combination of tactics.

A related commonality among these organizations is the degree to which they are respected by the clients they are serving. A member of the OSME staff writes:

> Mutual respect for one another in the mathematics educational community is one of our greatest assets as demonstrated by the past success conducting conferences, meetings, programs, and projects. (Nesseth 1975)

The organizations move beyond the inclusion of respected leaders within their own particular organization to development of other leaders who can effectively help implement local programs.

Research and literature stress the importance of leadership in curriculum implementation, supporting the importance of this aspect of the program. The various approaches reflect research findings that well-informed subject area consultants within a school enhance the possibility for effective dissemination and implementation, easing implementation problems. Thus OSME sees "identifying and developing people at all levels of education who are capable of encouraging innovations in mathematics instruction and who are in positions to lead and support others in improving their instruction" as one of its main functions. The FUSE program conducts Leadership Specialist Conferences to "enable participants to develop strong leaders in unified science." Jay Greenwood, who directs an OSME-supported program in Oregon, views the major purpose of the program as training teachers as change agents. The Textbook Adoption Committee Training Course prospectus lists the following objectives;

- To expose participants to relevant research, trends and content in mathematics education.
- To expose participants to contemporary learning theories and their implications to mathematics education programs.
- To expose participants to theories on how children learn mathematics and the maturational differences associated with growth and development.
- To assist participants in identifying the appropriate role of the textbook in classroom instruction.

- To demonstrate the necessity for materials that support the staff-development concept.
- To assist participants in developing criteria to be used in assessing mathematics materials.
- To provide experiences in selecting materials based on self-developed criteria.

A main emphasis is placed on inservice education.

This grows out of a belief that preservice education is insufficient preparation for a lifetime of teaching. Neither do the leaders see traditional inservice programs as providing necessary support. As Taylor (1975) explains, traditional inservice courses may suffice for changes involving only minor textbook alterations; but wholesale reform of curricula like new math programs or reforms that involve a changed teaching approach, like the open classroom, require a different sort of inservice.

Many of the leaders place a majority of responsibility for what happens in the hands of teachers.

This is based on a belief that the organization should "build on teachers' motivation to take more, not less, responsibility for curriculum and instruction decisions in the school and the classroom" (Devaney & Thorn 1975). Educators who believe in putting more control in the hands of practicing teachers, who emphasize the necessity for teacher input into curriculum decisions and inservice training, argue that recent curriculum reforms failed in large part because they bypassed the teacher--placing main reliance in the curriculum materials, making them "self-instructional" for pupils. They argue against

training that is confined to the mechanics of one curriculum and in favor of inservice education that builds a more general foundation of teacher initiative.

The strategies employed reflect research findings about the importance of cooperative decision making for successful implementation.

Although teacher involvement in change is viewed as extremely important, there is an understanding that meaningful change cannot occur without cooperation of the entire school community. A OSME staff writer notes that the organization's mission can best be fulfilled through "improving communication among all people with an investment or interest in mathematics and mathematics education"(Nesseth 1975). FUSE developer David Cox emphasizes that everyone--university professors, teachers, counselors--must be involved in implementation of a program.

Many of these groups are linked with others working on similar problems.

Local groups supported by these organizations do not tend to work in isolation from one another. Networks of people working on similar programs, or with similar problems, have developed naturally. A good example is the teachers' centers network augmented now by the Teachers' Centers Exchange, a group that disseminates information about teachers' centers and puts inquirers in touch with those who can best offer technical assistance and advice on implementation. Cox of FUSE notes the importance of continuing contact so that each group does not reinvent the wheel. At each level, these organizations can be viewed as networks--teachers offer information and resources to one another; district leaders share with other interested colleagues, as do state and national organizations working on the same problems.

Research evidence documenting effects is minimal.

These arrangements are criticized by some who question whether programs based on voluntarism can cause significant change in education, whether they only attract the best leaders and teachers--those already inclined toward innovation (see, for example, Rogers 1976). And, to many the organizations appear frail, surviving only on "soft money," and unfortified by traditional approaches to diffusion.

Unfortunately, useful evaluation of these organizations is minimal. There is little research evidence which supports their critics or documents the organizations' effectiveness. Because each of these organizations differs in structure and combinations of approaches, it is very difficult to segment and evaluate the programs as a whole. Where evaluation is conducted, it is debatable whether the right questions have been asked, and evaluations have focused on center participants, thereby prompting the criticism that the sample studied is not objective (see for example, Warren 1975 and Lickona & Hasch 1976).

In general, indications based on response from participants are very positive. One indication of success of programs that were initially developed with government or foundation money is that they are now being funded by school districts themselves. An example is the circuit riders program in Eastern Oregon, a program originally supported by OSME. A few teachers' centers, like the Teachers' Active Learning Center in Oakland, have been incorporated into districts (Buxton 1976). Research on response to teachers' centers shows very positive teacher-evaluation, teacher-reported student enthusiasm for changes developed by participants, and increases in teachers' confidence (Lickona & Hasch 1976).

Although evaluations may ultimately show the effectiveness of an organization, the information will not provide one model for others to replicate. Each of these organizations grows, developing, adding, and emphasizing various strategies growing out of knowledge and responsiveness to its clientele.

The promise of these organizations rests on the importance of long-term sustained support at each level of participant growth--from awareness through implementation and adaptation of innovations, to further modification and new implementations. Their commonalities suggest characteristics growing out of principles in the implementation literature but blended in a flexible organization capable of meeting local needs through a variety of services.

Examples of these arrangements exist at national, regional, state, and local levels.

As mentioned, The Federation for Unified Science Education (FUSE) is an example of such an organization operating at the national level. FUSE uses many strategies to provide interested science educators with information and assistance in development of local unified science programs. A FUSE staff member describes the program's main purpose and activity:

> . . . to provide a system of mutual help in solving common problems . . . active consultation and long-range cooperation with school groups in the actual development of unified science programs is a major activity of the Center. Often this takes the form of a team effort involving Center personnel and people with unified science experience from within the geographical region of the concerned school group (Thompson 1975).

The Center is located at the Ohio State University, staffed by a director, a coordinator, secretary, and several part-time professionals. FUSE members also assist project staff when needed. Staff engage in awareness activities, disseminating information about unified science

through a project newsletter, through national conventions like NSTA, or through regional FUSE conferences. Staff or regional FUSE members offer regional two-day workshops to inform educators about FUSE and its implementation. A college credit course in design and development of unified science is taught at Ohio State. Those interested in learning more about unified science or in developing curricula are invited to the Center for a short (one- to ten-day) working visit or a longer period--during the summer or sabbatical leave. Doctorial students work at the Center. The staff puts educators working on similar programs in touch with one another through its networking activities.

The Center houses a collection of program descriptions, student instructional materials, library, test file, evaluative studies collection, and workshop modules. The emphasis of the program is on local adaptation of national curricula coupled with locally developed materials.

Members of unified science teams help create awareness about the program and lend their expertise to groups of local teachers interested in developing and implementing programs of their own. David Cox--a teacher at Rex Putnam High School in Milwaukee, Oregon, former research associate at the FUSE Center in Ohio, and one of the developers of the Portland Project--describes the project's initial development, combining curricula such as PSSC physics, Project Physics, CBA chemistry, CHEM Study, and BSCS biology, in combination with local materials. High school teachers and other educators worked together with scientists, many of whom were from Portland State, on the project. Among the valuable outcomes he sees are the relationships that have evolved between high school and university instructors: "We are on a first-name basis with scientists at the local universities. If we have a question, we can call; they are resources most people never have. The university is

a genuine resource for the community; it is not an ivory tower" (conversation, March 1976).

At the state level, an example is the Oregon System for Mathematics Education. Eugene Maier, director of the Oregon System for Mathematics Education (OSME), sees the important aspect of their program as its emphasis on support of locally developed programs. Formed in 1971, the policymaking body of OSME, the Oregon Mathematics Education Council, funds a variety of mathematics education projects designed around a local need, using approaches applicable to the particular community, and implemented by local personnel. OMEC funds, for example, two "circuit riders" to assist teachers in schools in sparsely populated Eastern Oregon. Other projects provide for development of local leaders to serve as advisors to other teachers, provide for secondary teachers to work with elementary teachers, and provide financial support for math educators to gain additional background that will help them to assist others in their own communities. The project serves not only the needs of the elementary, but also of the secondary and community college instructors. High school teachers of remedial math are introduced to new methods and materials through local courses; a project supported by OMEC developed vocational-technical materials in nursing, business, law enforcement, and millwrighting for high school and community college students. Preservice needs are addressed through project-sponsored methods courses and field experiences.

A report of first-year activities states:

> OSME has demonstrated that personnel from an informal agency can move between the traditional agencies and institutions of the state and communicate with them about issues in mathematics education, stimulate them to examine their own local and/or institutional/agency needs, help them think through and implement local solutions and, often use local resources (Thomas, n.d.).

A "multi-district" level approach is illustrated by the Twin Cities

Social Studies Service Center and the Science and Mathematics Curriculum Exploration Center.

The Social Studies Service Center was developed to help individual teachers, to offer inservice training, and to provide professional staff for curriculum consultation to schools and school districts. To provide this service, the Center has developed a repository of current social studies curriculum materials for use with students from kindergarten through twelfth grade. The repository is made up of nationally developed curriculum projects, supplementary materials that reflect the emphases of the national projects, agency developed projects, publisher developed materials that reflect present trends in social science education, and locally developed curriculum materials and guides.

However, the activities of the Center go well beyond the accumulation of instructional materials. It has:

- sponsored meetings, workshops, demonstrations, and courses in the Center or other appropriate locations in order to inform teachers about curriculum materials, strategies of instruction or curriculum implementation;
- provided consultation and leadership in the development and implementation of inservice teacher education programs; and
- provided consultation to all schools and school districts for analyses of social science curricula and materials being used to assist in identification, evaluation and listing of material and to assist in local development of new curricula.

This program was initiated in 1971 under an ESEA, Title III, grant. The Center currently operates as a consortium of thirty-one local districts which pay dues apportioned according to size. Though the Center would prefer to establish long-term programs with member school districts, the

uncertainty of annual funding has prevented the full development of such relationships. As seen by the Center's Director:

> We need some sort of solid funding. . . . Each year is up for grabs. You can't hold staff or cement relationships with a district so long term plans can be laid. (Conversation, March 1976)

Another pitfall is the pressure to become a lending library. The Center's director reports that many districts initially wanted only a lending library. However, the Center staff felt that to really effect change would require more. By delivering on the consulting service idea, they were able to demonstrate to these districts the benefits of their service. Thus, these districts now are willing to purchase these services. However, the severe financial limitations facing all school districts have cut into the financial support of the Center.

Another multidistrict center, the Science and Mathematics Curriculum Exploration Center (SMCEC), is housed on the first floor of an old high school in Jeffersonville, Indiana and serves educators from 36 public educational agencies, as well as parochial and private schools, in fifteen surrounding counties through ESEA Title III funding. Administrators and elementary and secondary teachers drop in through the week or make a Saturday appointment to visit the display of commercial and federally-developed curricula. All materials can be checked out and taken back to the classroom for trial use--at no cost to the school. The Center thus provides local educators with an opportunity to explore new materials in the areas of science, math and metrics and to talk with the science and math consultants who staff the Center. The two staff members custom design workshops, free of charge, for administrators, elementary and secondary teachers, and offer help in classrooms if a teacher, school or

district is interested in implementing a new science or math program. Staff member Ken Potts, a former high school science teacher, is knowledgeable about recent curriculum developments in science and is aware of problems local districts have in adopting and implementing new programs. For example, he says that many schools are moving toward ESS because of its flexibility: it can be adopted on a yearly basis, a uni or units at a time, and it blends well with textbooks or other types of programs. He explains that districts seem less interested in programs like SCIS because of the expense and less flexibility and AAAS because of problems in managing and replacing items in kits, as well as the expense.

During the summer, teachers receive graduate credit through Indiana University for courses they attend at the Center. Using the Center workshop, tools and scrounged materials, teachers can make their own materials, such as balance beams and trundle wheels; and develop their own unit boxes of materials based on teacher guide(s) from nationally-developed curricula. These materials can be scrounged for a fraction of their commercial cost. This exercise is frequently the beginning of true inquiry teaching by workshop participants.

The Urban/Rural School Development Program is a U. S. Office of Education experiment in staff development for single school districts. The federal money was dispensed to the local school districts and used by site-specific school/community councils to design and implement innovative approaches to improving their schools. The rural sites in particular found that the training resources available to them were extremely limited by their distance from the kinds of institutions for training and higher education that are generally located in and around large metropolitan areas. These sites had few alternatives. The most

prevalent involved hiring outside consultants who could visit the site only for one or two days at a time.

This isolation from needed resources is common to rural school systems throughout the country. The solution developed in this project was a university-affiliated, field-based professor who would live and work in the particular Urban/Rural project area, teach courses for school and community people, and consult in teachers' classrooms on an as-needed basis in order to ensure effective implementation of new methodologies and teaching approaches. The first Urban/Rural sites to implement this idea were Macon County, Georgia and Wise County, Virginia. In these two instances, the local project contracted with a nearby college or university to jointly develop the resident professor program. The selection of the resident professor (or professors--the number determined by the needs and resources of the project) was a joint endeavor as well. As noted above, this resident professor program, as indeed, the entire Urban/Rural project at the local site, was under the direction of the School/Community Council. This body was made up of teachers, administrators, parents, and sometimes students. The programs developed in each site addressed the needs and concerns of that educational community.

The success of this approach was noted by other Urban/Rural sites. By 1973-74, four additional sites either had initiated or were planning similar programs: Bayfield, Wisconsin; Crystal City, Texas; Hays/Lodge Pole, Montana; and Louisville, Kentucky. With this spread, the resident professor approach to problem solution and change is being applied to a school system serving a densely populated urban area (Urban/Rural 1975).

At the local level in many places in the United States, teachers' centers have been formed to offer continuing support for teacher growth.

The phenomenon is not unique to this country. In England, centers were formed to spread effective implementation of Nuffield mathematics, a program that put emphasis on teacher education rather than on development of student materials. Edith Biggs (1974), Her Majesty's Inspector for Mathematics, points up the important aspects of both American and British centers:

> Their most important function is to provide a meeting place where teachers can gather regularly to interchange ideas, to compare classroom experiments, and to learn, at least in part, by investigation, the mathematical background that will give them the confidence they need.

Center leaders (often former teachers) or practicing teachers conduct workshops growing out of teachers' own expressions of their needs. In these hands-on, active learning courses, teachers come voluntarily to learn about new methods and materials, or to develop their own. Centers frequently include curriculum libraries that display copies not only of commercially available materials, but also of those developed by participant teachers.

One such center, the Mountain View Center for Environmental Education, grew out of David and Frances Hawkins' work starting and shaping the Elementary Science Study at Education Development Center in Newton, Massachusetts, and from their observation of English advisory work with teachers in informal classrooms. Other centers have also grown out of leaders' participation in the Elementary Science Study: in Philadelphia, Washington, D.C., St. Louis, New York, and Boston. Other major curriculum developments have influenced the original developers to begin teachers' centers: Vincent Rogers at the University of Connecticut was involved in development of Project Social Studies and subsequently initiated a center.

Another center in San Diego, California is the outgrowth of the Specialized Teacher Project which drew heavily from the Madison Project in mathematics.

A brochure from the Mountain View Center expresses the intent of the Center to provide support for long-term change in education:

> Our institutional purpose is to demonstrate that a relatively small group of people with special professional skills who are devoted to aiding teachers can make a substantial and growing contribution to the quality of education in some schools which seek their help . . . and thus to provide an American prototype of a potentially major new component in school systems. We also see it as necessary to maintain and extend national and international connections with other groups having the same basic commitment and which have ties with schools, and with teachers and their children. (1976)

CHAPTER 4

CHANGE STRATEGY EVALUATION

By now it is clear that strategies for curriculum change take a variety of forms. People concerned with their relative effectiveness would like to have comparative evaluations, but the current literature shows a patterr of inadequate efforts in this regard.

The task of evaluating social change programs is extremely difficult. While it has been greatly improved by the work of sophisticated methodologists (starting with Campbell and Stanley in 1966 and represented now in the pages of Evaluation magazine and in anthologies such as the Struening and Guttentag Handbook of Evaluation Research), still, results of most studies continue to be inconclusive and ambiguous. Change programs are usually complex, with a number of strategies and tactics applied simultaneously or improvisationally. This complexity poses evaluation problems, making it difficult to tease out effects of separate program elements and program elements in interactive relationships. Alternative change programs with differing goals are not easily compared. Even within a single program, the kinds of effects sought may take many forms and change over time. Further, even if proper controls and rigorous measures can be applied, there is much disagreement over the standards for success, i.e., the explicit or implied goals of a curriculum change program. This is a particularly troublesome problem since the goals of a change program should shape the form it will take and the results it will have.

This chapter presents alternative dissemination/implementation goals (awareness, adoption, use, and student outcomes) and discusses when each kind of goal is likely to be appropriate or useful. A concluding section

summarizes the most common weaknesses of change strategy evaluations and suggests how these might cloud interpretations of evaluation results.

In the absence of data on actual use and impact of change strategies, change planners may present evidence of *potential* use or impact by measuring the number of potential users to have a quality of awareness or knowledge appropriate for change.

The usual rationale for setting awareness or knowledge goals and offering corresponding evidence as a standard is based on three points: (1) it is possible to aim a low-budget awareness campaign at a large target audience if the costs of other kinds of change efforts would be prohibitive; (2) awareness and knowledge are relatively easy to measure over a large sample where many other change goals are not; and (3) certain knowledge must precede change, whether it be awareness of the existence of an innovative curriculum alternative or the knowledge required to change one's teaching practices. Although they present challenges to the change strategist's imagination, points one and two are fairly sound. Counterarguments to the third point stress that awareness alone is insufficient for change. Turnbull et al. (1974) report on the general ineffectiveness of awareness campaigns for furthering adoptions and use of new curricula. It seems that when people have not yet heard of a particular change effort, simply bringing them to a state of awareness is not sufficient to move them to action.

If awareness/knowledge goals are set, they need to specify the content of learning (what is to be known); the target (who and how many will know); the time period (when and for how long); and at what cost. Thus, change planners may aim at communicating fairly superficial

information to a large number of potential users very quickly and for immediate use; or they may want to convey very detailed information to a few highly placed decision makers and spend a long time doing it. The information may relate to the immediate availability of one or more specific curricula, or it may be general, "curriculum-free" information needed for facilitating change (e.g., information about how to initiate and plan change, how to carry out local development, where to find expert assistance, and so forth). Planners will also want to consider how much money to invest in the achievement of awareness/knowledge goals, especially in comparison to the other sorts of goals discussed below.

Change planners may set their goals in terms of numbers of purchases, rentals, actual trials, or other kinds of permanent or temporary acquisitions of one or more specific innovations.

The argument for aiming at adoption as a change goal is threefold: (1) adoption goals may be even easier to specify and measure than awareness goals; (2) acquisition is necessary for use; and (3) it is one step closer to use than awareness/knowledge.

Adoption goals are easier to specify and measure than awareness goals if evaluators can control the "inventory" of an innovation--for instance, if each adopter purchases some product. By keeping track of, say, textbook or teaching manual sales, evaluators can monitor the observable actions taken in regard to a specific curriculum option much more easily than they could poll potential users to determine their knowledge.

There are counter arguments, though. For example, while acquisition is necessary for use, it is well known that adoptions do not necessarily lead to use. An individual may formally adopt a change and then fail to put it into sustained practice. Within an organization, the responsibility for adoption and the responsibility for use may not rest in the same hands, and when administrators make the adoption decisions, teachers may not maintain those changes. Thus adoption figures may overestimate the case that an innovation has been disseminated. Conversely, if sharing among users goes on, adoption figures may also underestimate dissemination. Welch (1968) cautions that textbook sales give a distorted estimate of curriculum use because of the distribution of examination copies, the sale of single copies, and the re-use of texts from year to year or class to class. He gives the example of the developer's estimate of PSSC usage of 1964-65, which proved to differ by a factor of two from USOE figures obtained in a sample of high schools.

On the third point, that adoption goals are more meaningful than awareness goals, there are also differing opinions. The linear sequence from knowledge to adoption to use, while ostensibly logical, does not always correspond to reality. Adoption may occur where virtually no knowledge exists (as with "faddish" innovations where community pressure rather than problem-solving motives are behind the adoption), and in such cases the adopter may later have to learn how to use the innovation. Some adopters, who never do acquire this knowledge, only change in the most perfunctory way; thus, evaluating users' knowledge can be important (Fullan & Pomfret 1975).

Even if all the points favoring use of adoption goals are conceded, there is an important danger to consider in setting and aiming at

adoption goals. Nelson and Sieber (1976) note that in view of ". . . the doubtful value of many widely accepted innovations, the sheer enumeration of adoptions may reflect only salesmanship or community pressures rather than enlightened educational reform." If this is so, strategies to achieve adoptions may by themselves be harmful to education. Perhaps the educational community should demand that developers or other change planners who set adoption goals qualify them as "meaningful" adoptions and somehow operationalize that to reflect real problem-solving ends. This, of course, would present significant measurement problems.

In setting adoption goals, the planner needs to specify the action(s) to be included (purchases, rentals, loans, etc.), how many and by whom, over what time period, and for what financial investment. In particular, he will need to carefully consider the question, "adoption by whom?," since particular opinion-leaders may have varying influence at different points in the change process.

A grave weakness in the literature on educational innovation is the persistent failure to measure the change in behavior--what is being done that is *different*.

A dependent variable or goal of awareness or adoption as a result of change efforts does not automatically imply that a curriculum is being used. Empirical investigations have shown that self-proclaimed innovators very often display no difference from conventional practitioners (Goodlad & Klein 1970). A lengthy discussion of this flaw in the literature is provided by Gross et al. (1971), who cite numerous examples of studies with weak or nonexistent measures of implementation. More recently, Fullan and Pomfret (1975) and Kester (1976) point to the need to study the implementation process, not simply to learn whether changes are actually occurring, but also so that developers can see what strategies foster what aspects of use and what other outcomes. For example, more detailed studies could

tell us that participatory planning by teachers leads to more team teaching but also to difficulties with hierarchial staffing arrangements--as Wacaster (1973) found--and could go on to relate these innovations to student outcomes. Thus, change planners may set their goals in terms of use for these reasons: (1) unlike awareness and adoption, use represents actual behavioral change; and (2) both summative and formative evaluation of change efforts depend on knowing whether and how the treatment has, in fact, "taken."

These arguments favoring use or implementation as a goal (expressed by Fullan & Pomfret 1975, Paul 1976, Hall & Loucks 1976, among others) are so cogent, the question is, why doesn't the educational community agree that this is the minimal acceptable evidence for program success? The answer is that implementation is extremely difficult to operationalize. That is, if use goals are to be set, what will be the operational definition of "acceptable" use? Charters and Jones (1975) note that evaluators can try to determine what is taking place at a site on one or more "levels" of practice: (1) institutional commitment to introduce an innovative program (i.e., adoption); (2) structural context, including changes in the organizational assignment of responsibilities or in the physical setting; (3) role performance by staff members (are teachers behaving in new ways?); and (4) learning activities of students (are students having new experiences?). Changes at any one of these levels do not guarantee changes at the next level. But because the levels pose progressively larger measurement problems, the operational goals of a change effort may have to be developed on only the first or second level.

There is now controversy over the value of precise, predetermined goals for users' implementation of a particular change. Should "use"

of a new curriculum be recognizable as a specific set of activities, or may there be a number of variations of those activities which are also counted as "uses?"

Many argue that some adapting of a curriculum to better suit local needs is desirable (Fullan & Pomfret 1975, Turnbull et al. 1974). In fact, Berman and McLaughlin (1975) contend that adaptation is one signal that implementation has occurred. The extreme position is that educational innovations are not transferable, because each educational setting is unique, and programs must be "built" from the immediately available surroundings (House 1975, May 1975). In effect, "use" will differ from one school to the next. A less extreme but basically consistent point of view argues that a new curriculum, especially in early stages of its development, is likely to have several equally promising possible forms and should therefore assume this variety of forms during use (Fullan & Pomfret 1975). Developers in two nationwide experiments, performance contracting and Head Start Planned Variation, took this approach in that the models they had initially developed were modified considerably at each of the experimental sites (Carpenter-Huffman et al. 1975, Lukas 1975). This approach serves a development function when it permits general improvement of the curriculum, and an implementation function by rendering the curriculum more compatible with local conditions and getting users involved with it.

If adaptation of a curriculum is anticipated, we may need some new conceptual approaches to setting implementation goals. Most current research on users' implementation is based upon the notion that they eventually put a certain, predetermined plan into operation, and so the research is geared to finding indicators of the expected change. But if users behave in divergent ways, it may be fruitless to look for replication

of an innovation model. Abandoning the goal of replication, change planners and evaluators would need new standards for acceptable or successful user implementation. And arriving at such standards would be difficult, since goals that are locally modified after adoption tend to diminish rapidly, as attested to by the Rand case studies of projects where sweeping plans were continually scaled down (Mann 1976). Indeed, Pellegrin's research (1973) shows that, in schools where differentiated staffing had been proposed but never implemented, people eventually described whatever they were then doing as their goal. Thus, if evaluators try to avoid rigid goals for replication of a model, they risk becoming the captives of local standards that define any existing activities as successful implementation.

Apparent curriculum adaptation may, in fact, be distortion, brought about as users reshape the new program to make it operate like a traditional one (House 1974). This final point is especially poignant for curriculum developers, who may argue that, after all, they are most knowledgeable on the form a curriculum should take. In short, we lack the tools to distinguish productive adaptations from dilution or what Berman and McLaughlin (1974) call "cooptation" of an innovation.

So, in setting use goals, the change planner needs to consider how much fidelity he should seek in order to determine that an "acceptable" use has occurred. Not only is this important for developing measures to determine his success, but it will have crucial implications for his change strategy. It may be that the advantages of user-adaptation (involvement with the change, improvement of the curriculum in relation to local needs) can be retained without the disadvantages associated with

unclear innovation guidelines if change planners consider how to foster "systematic adaptations" of innovations.

In setting use-goals, change planners may aim at achieving a variety of uses, but set some limits on that variety. To solve the measurement problems in this way, the forms that use may take are anticipated beforehand--something that is easier said than done. Change planners are quite far from being able to specify the crucial elements of their innovations (Lukas 1975). In practice, they seem to find that different elements are important under different circumstances.

Few change planners set dissemination goals in terms of impact or student outcomes.

Educational change efforts are intended ultimately to affect students. Other goals are really only independent or intervening variables in a process that is intended to improve learning (the dependent variable) by an innovative educational treatment. But few developers set student learning as their goal. They point out that if their programs or curricula have been demonstrated effective in a test setting, and if they are purchased and used, student gains will be likely. In short, goals for dissemination tend to emphasize measurement of the spread and potential effectiveness of an innovation, not measurement of its impact on students.

Resistance to setting standards for student outcomes is understandable. First, such an undertaking requires some contact with a sampling of students, and good evaluation design requires that some serve as controls. Schools are reluctant to make random assignments to determine who will

get the opportunity to benefit;* further, they hesitate to agree to the sterilizing of the learning environment which helps researchers tie together causes and effects, and they (and the students' parents) are often reluctant to administer and return relevant data-collection instruments. More important is the problem that the array of intended and unintended outcomes which should be measured to determine impact is invariably complex and often requires one or more years to follow up. In fact, this problem may be used to argue against accepting findings of no change (Hall et al. 1975).

But the fact remains that the raison d'etre for change efforts is impact on students, and the problems associated with setting such goals must be more effectively dealt with than they have been in the past. When set, such goals should indicate how many students and what groups of students are aimed at; what outcomes are expected, in what time period, and for what costs.

Goals other than awareness, adoption, use, or student outcomes may be justified.

In a recent conversation, Charles Fleenor of Addison Wesley noted that one goal of innovative development programs is to influence materials being developed commercially (October 1975).

A Rand study proposing to assess the impacts of the curriculum development movement and to assess what has been learned about the R&D process and implementation will not only look at effects of the new programs on students,

*Although Crain & York (1976) were able to overcome this obstacle by pointing out to participating schools that a potentially beneficial treatment for a smaller group would be more effective in the long run than spreading resources so thin that no one would experience a real change.

but will also gather information on effects on commercial publishing, teacher education, standardized testing, and on the education R&D community:

> Including by-product effects may also be important in estimating the overall impact of the curriculum studies because the general trend of evidence on direct effects is mixed: some studies indicate positive and lasting effects, others, temporary effects or no effects. If a careful synthesis of the literature confirms this, or if the result is that the existing research and evaluation literature is not sufficient to lead to a conclusion, then by-product effects may turn out to be the most significant results we have to present (Wirt 1974).

Goals set by non-profit institutions should include realistic analyses of required costs.

Generally, non-profit developers and disseminators use supply-oriented rather than demand-oriented costing procedures. Their "return" does not include financial profit but rather, demonstration of diffusion, use, and impact. While this may be fitting and proper, it is an important qualifier of change strategy goals, since continuation or replication efforts may be less heavily subsidized. For example, commercial publishers will be unwilling to market federally-subsidized innovative developments which do not promise some financial return (Moser conversation, October 1975, Rosenau 1976). If financial cost to the user becomes a new feature of a curriculum after it has been developed and evaluated, this may change user response to the curriculum, so that previous assessments of its acceptability are invalidated.

Common Methodological Weakness In Change Strategy Evaluations

Evaluation may rest on overly ambitious goals.

Meaningful change takes time and considerable effort. Hall et al. (1975) note that differences in an innovation's effectiveness across sites may be attributable to varied levels of implementation among users. Their "levels of use" framework defines stages of innovation adoption proceeding from nonuse to orientation, initial training, mechanical use, independent use, integrated use, and renewing. These researchers emhpasize the importance of considering levels of implementation when conducting summative evaluations: it is impractical, they stress, to assume that the innovation's ultimate impact can be accurately measured if summative evaluations are conducted during the first cycle of use of an innovation, before most users have had a chance to reach a high level of use. Potentially useful programs may be prematurely abandoned if they do not live up to unrealistic goals.

Another view of the dangers of relying on initial goals emerges from the Rand change-agent study (Greenwood et al. 1975, Mann 1976). Because projects tend to scale down their goals as they go along, evaluators are almost certain to report implementation failure if their standards are dictated by the original innovation plans. As Mann (1976) observed, local staff-training projects consistently became less ambitious about effects on students, simplified their treatments, slowed their pace, and reduced their expectations about the amount of change from individuals and the number of individuals who would change. By their original standards, then, nearly all projects may well "fail," and evaluators should consider whether their purposes will really be served by setting up a foregone negative conclusion.

A longitudinal perspective is needed in change strategy evaluation.

There are two major reasons for studying change outcomes over time: (1) what appears to be a success may later turn into a failure and vice versa, and (2) detailed studies of the change process over time will increase our knowledge of the way strategies operate. On the first point, researchers who have studied local innovation efforts longitudinally or retrospectively are unanimous (Gross et al. 1971, Smith & Keith 1971, Charters et al. 1973, Bentzen 1974, Berman & McLaughlin 1975): a change is implemented (or not) slowly, with frequent detours from the original plan as barriers are encountered. The literature now contains several case studies in which high hopes are followed by ever larger disappointments (e.g., Jones 1973, Wacaster 1973, Pressman & Wildavsky 1973), but we also have some studies of eventual success--in which, significantly, implementation did not meet the original timetable (Mann 1976, Greenwood et al. 1975). As regards diffusion over a population of potential users, highly innovative curricula meet with very slow acceptance, as was the case with the science curricula developed in the 50's and 60's (Moser conversation, October 1975). Similarly, individual implementation follows a gradual progress to mastery of the way an innovation was supposed to operate, followed by adaptations that may increase its impact (Hall et al. 1975). Clearly, findings about the effects of a change strategy will differ depending on the "level of use" that has been reached.

On the second point, that longitudinal studies may inform change planners about the way their strategies operate, Fullan and Pomfret (1975) say that knowledge of the implementation process may well be more important than knowledge of outcomes (see also Kester 1976). Studies of the process now tend to be highly descriptive (Bentzen 1974, House 1975),

but this may be inevitable until we have better-developed notions of how change strategies progress.

The experimental treatment is usually complex and not easily compared to no-treatment or to an alternative treatment.

The complexity of treatments makes it difficult to operationalize desired effects. "Too frequently aims and objectives are . . . insufficiently specific to bear evaluation" (Freedman & Freedman 1976). These authors point further to the endless contaminating variables in innovative (alternative) schools and the inappropriateness of comparing these innovative schools with others, since by virtue of their special treatment they are no longer reasonably parallel.

Evaluators can't usually use randomly-selected controls.

As noted earlier (p. 109-110) selection of subjects who will not receive the treatment may be a delicate matter. Where all subjects receive treatment, or where they are "purposively" selected to receive the treatment, there remains the question of whether something other than the experimental treatment which the group has in common may explain any observed effects.

Evaluations may ascertain adoptions and measure "effects" without taking care to document that the two are meaningfully related.

Charters and Jones (1975), Fullan and Pomfret (1975), Paul (1976), and Hall and Loucks (1976) discuss this point, noting that this may lead to spurious interpretations:

> Before grand claims are made for the effects or absence of effects of a given treatment or innovation, practitioners . . . need to know if and how the innovation was actually used (Hall & Loucks 1976).

National evaluations of the impact of compensatory education under Title I of the Elementary and Secondary Education Act are a case in point. Assuming that poor children had participated in compensatory programs if their school districts had received Title I funds, evaluators looked for a nationwide change in achievement-test scores. Not surprisingly, little change was discerned; we now know, from detailed studies of district budgets, that much of the funding went for ancillary, nonacademic services that may have already existed in those districts (McLaughlin 1976). But the disappointing evaluation findings continue to fuel the argument that compensatory education is a failure.

Many change strategy evaluations have limited generalizability, due to the sampling method used.

For example, in measuring the reported use of particular curricula, Cawelti (1967) surveyed only accredited schools and Conant (1967) limited his sample to medium-sized, comprehensive high schools that sent between 25 and 75 percent of their graduates to college (Welch 1968). Surveys of individual students are also prone to sampling problems. Educational Testing Service has surveyed students taking the College Entrance Examination Board Achievement Tests and Advanced Placement Tests, asking them about their high school curricula, but admits that the students who choose to take these tests are not representative of their peers.

A major source of sampling problems is self-selection. If a study uses a population of schools or individuals that have voluntarily decided to change, its results may not be generalizable to a larger, less innovative population. Apparent effects of a change program may

have been inherent in the participants at the outset. Anderson and Horn (1972) found significant behavioral differences between self-selected vs. other teachers in an inservice program.

Frequently, response rates are so low that results must be questioned. Once the sample has been drawn, nonrespondents introduce further bias; the Cawelti (1967) and Conant (1967) surveys mentioned above suffered from appreciable nonresponse rates and thus gathered data only from schools where someone was willing to report on the use of innovative practices.

Measures often depend on self-reports, and these may be inaccurate, especially if the behavior is ego-involving (thus inviting users to distort) or so subtle or complex that users are not able to make a reliable assessment. If the people asked are in some way being held responsible for implementation, or if it is a prestigeous thing to be doing, they are likely to exaggerate its extent. For example, a questionnaire that asks teachers and principals whether their school has "individualized instruction" is likely to yield inflated estimates of the extent of the practice (Goodlad & Klein 1970). Nor do all the difficulties with such measures stem from self-interested reporting. Lukas and Wohlleb (1972) point out that teachers asked to rate their own implementation of a Head Start model have seen few other classrooms using the model and so have only a vague standard for their own performance. Some teachers whose work a knowledgeable observer rates as very close to a model may be beset by self-doubts and assign themselves low scores.

However, self-reports are not necessarily inaccurate, as studies by Crowther (1972), Cole (1971), and more recently by Scheers (1974) demonstrate. The important point here is that, where possible, self-reports should be checked for consistency and validity by using multiple

measures, unobtrusive measures, and reports from others at a site. Respondents may be asked to recognize or recall particular information; they may be asked for an indication of motivation or commitment as a result of the information; or they may be asked to take some action (seek more information, attend a demonstration, etc.). Where this is done the evaluation is strengthened.

Observational studies also have problems, such as the reliability of measures and the operational specification of key program elements.

In the past few years, observational studies of users' implementation have multiplied. Some are year-long case studies of individual schools' attempted innovations (Gross et al. 1971, Smith & Keith 1971, Charters et al. 1973), while others are one-time measures of fidelity to a planned innovation (Ashley & Butts 1971, Crowther 1972, Leinhardt 1973, Elliott & Addman 1974, Evans & Scheffer 1974, Hess & Buckholdt 1974, Naumann-Etienne 1974, Shipman 1974, Solomon et al. [n.d.]).

Although direct observation overcomes the problems of self-reports, it brings its own problems, which have been explored in detail by Lukas and Wohlleb (1972, 1974) in their studies of the implementation of program models in Head Start Planned Variation. In the first study, after model developers had filled out checklists assessing each classroom's implementation on a one-dimensional scale from "unacceptable" to "outstanding," analysts realized that they did not know whether the different raters had used the same criteria. The scale had no anchor in definitions of full implementation of the models. Moreover, the developers' ratings were almost perfectly explained by a multiple regression equation

with three variables of intrastaff amiability and physical comfort at a site; in other words, the raters apparently equated pleasantness with fidelity to the model.

In the next year, researchers began to devise ways of specifiying and observing particular program elements (Lukas & Wohlleb 1974). This task proved difficult because developers were often unable or unwilling to indicate the bare-bones essentials of their models, and also because staff at the sites often defined the models differently than the developers did. Part of the difficulty of measuring implementation arose, then, because the models were not yet precisely specified; after two or three years of field experience, developers and school personnel were still unsure or in disagreement about what a fully implemented model would look like.

Testing instruments often have a content bias.

Measures used will necessarily favor the innovation if the test used is biased. Fullan and Pomfret (1975) report on this problem in studies where in control schools, the content of the evaluation measures is not presented or taught and cannot be expected to have been learned there.

The act of evaluating an educational program may itself have effects which may be confused with effects of the program.

If they are aware of the evaluation, change participants may perform at levels which they would not otherwise attain--the well-known "Hawthorne Effect" of testing. Freedman and Freedman (1976) and Zaltman et al. (1977) note instances where this has occurred in change strategy evaluation. Alternatively, performance might be severely disrupted, due to what Glass (1975) has called "evaluation anxiety."

CHAPTER 5

RESEARCH RECOMMENDATIONS

This report has reviewed both the literature and informed opinion of practitioners regarding strategies for the widespread use of innovative curricula. Having summarized the current situation--what is now known about the change process in schools and productive interventions in that process--we have several recommendations for future research. In brief, we recommend three sorts of endeavors: using what is known about the effectiveness of change strategies, learning more, and exploring new strategies.

Although practitioners have now accumulated a good deal of knowledge about strategies that foster curriculum innovation, the knowledge is not being used very systematically. Dissemination and implementation assistance remain largely improvisational. To consolidate and use the knowledge that now exists, findings like those we have gathered here should be shared more widely. They should also be put to work in a continuous process of improving change strategies. This already takes place in an informal way, of course, as the people concerned with dissemination and implementation learn from their experience how they can be most helpful to school personnel. But people who are professional innovation disseminators can themselves fall prey to isolation from their colleagues, and they may need more systematic ways of obtaining and using current information about strategies.

Besides summarizing present knowledge, this report has pointed to a number of ways in which more could be learned about the effects of change strategies. Future research should remedy four major deficiencies

that have hindered the evaluation of strategies. We need: (1) carefully controlled field trials; (2) better theories of the relationships among change strategies and school conditions; (3) baseline information about classroom practices; and (4) a clearer conceptualization of the various goals of strategies.

Controlled field trials would enable us to study the effects of particular tactics by breaking down strategies into their component parts and applying these experimentally. For instance, different information channels could be used for comparable groups of school people, as could different modes of consultant help (such as full-time "circuit riders" vs. colleagues in neighboring districts). Too often, researchers study implementation failures and then recommend whatever strategies seem likely to avoid the pitfalls they have observed. Without controlled field trials, there is really no way of knowing the worth of such exhortations.

Whether or not controlled field trials are feasible, we need to continue with present efforts to build theories of the change process. Many researchers have identified innovation attributes and local conditions that seem to facilitate implementation. Building on this research, we need models that account for the way different strategies work by finding the basic principles underlying our direct, trial-and-error experience. Some of these principles may be very simple (such as the general importance of interpersonal contact), but we can probably learn more if we view the change process as a complex, dynamic one in which variables of the innovation, the setting, and the strategy interact in different ways over time.

To gain an understanding of such a complex process, it is essential that we improve our measures of its outcomes. Uncertainty about whether change has occurred may make a study worthless, but researchers seem to give relatively little attention to the reliability and validity of their outcome measures. Several remedies are needed here: more awareness of the sorts of measurement pitfalls we discuss in Chapter 4, a continued increase in expertise with observational techniques, and the establishment of a baseline of information on current practice against which to measure change. The last point should be addressed nationally as well as in individual studies. That is, to determine what implementation outcomes would represent significant and beneficial change, we need to know with more certainty what is now going on in classrooms.

The whole question of goals is a complicated one, and we recommend continued attention to it. In this report, we have distinguished among strategies according to whether they focus on a particular curriculum, new curricula in general, new structures for continuing change, etc. We have also delineated awareness, adoption, use, and student outcome goals and have raised the issue of how much fidelity to a plan is sought. These analytic distinctions are very important because they prevent us from making misguided comparisons among strategies that have different goals. If two strategies are supposed to lead to the same outcome, their effectiveness may be meaningfully compared; but if they are different goals, selection between them must depend largely on which strategy's goals seem more desirable.

This report has focused on change strategies that have been tried empirically, and thus far our recommendations have dealt with using and increasing knowledge about these strategies. Like many other researchers,

though, we are tempted to speculate about some less familiar possibilities that strike us as promising. Our work suggests to us that there should be more mechanisms that help users adapt innovations to suit their needs and wishes. Recognizing that adaptation may be an inevitable part of the change process, we believe some change strategies should be geared directly to adaptive modification of innovations. This could take place in two ways: (1) the development process could include attention to an innovation's susceptibility to adaptive modification, and (2) implementation assistance could help users make systematic adaptations of innovations.

During development, the mechanism of field testing offers one opportunity to find out how users might need to modify an innovation, but to yield this information a field test would have to be fairly sustained--unlike the prevalent approach of giving users a brief experience with the innovation. Another informative technique would be focus-group interviewing, in which potential users tell developers what seem to be the key aspects of the innovation. This technique might help developers decide which elements of the innovation are essential and which could safely be modified by users.

When users are implementing an innovation, the people assisting them might work for systematic adaptation rather than replication of a model. In a rough way, each site could evaluate an innovation iteratively--beginning to implement it, observing the results, modifying either the innovation or the implementation strategy, observing the new results, and so on. Too much evaluation can strangle an innovation, of course, but technical assistance might offer simple methods of gathering and analyzing such information in order to make continuous improvements in the innovation.

To summarize our recommendations, then, we suggest: 1) that researchers and practitioners share and use their present knowledge about change strategies; 2) that researchers conduct field trials, continue to seek models of change, gather more trustworthy information on outcomes, and remain clear about the differences among goals; and 3) that new strategies that might further adaptive modifications be explored.

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